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number 10

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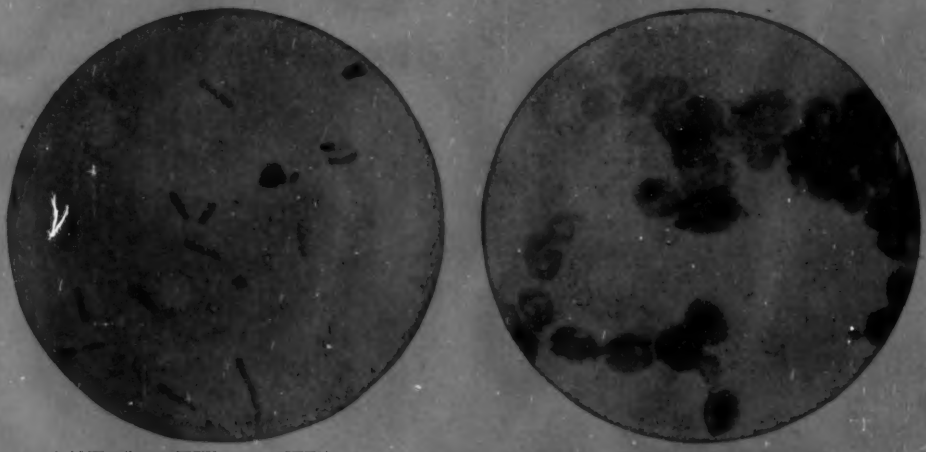

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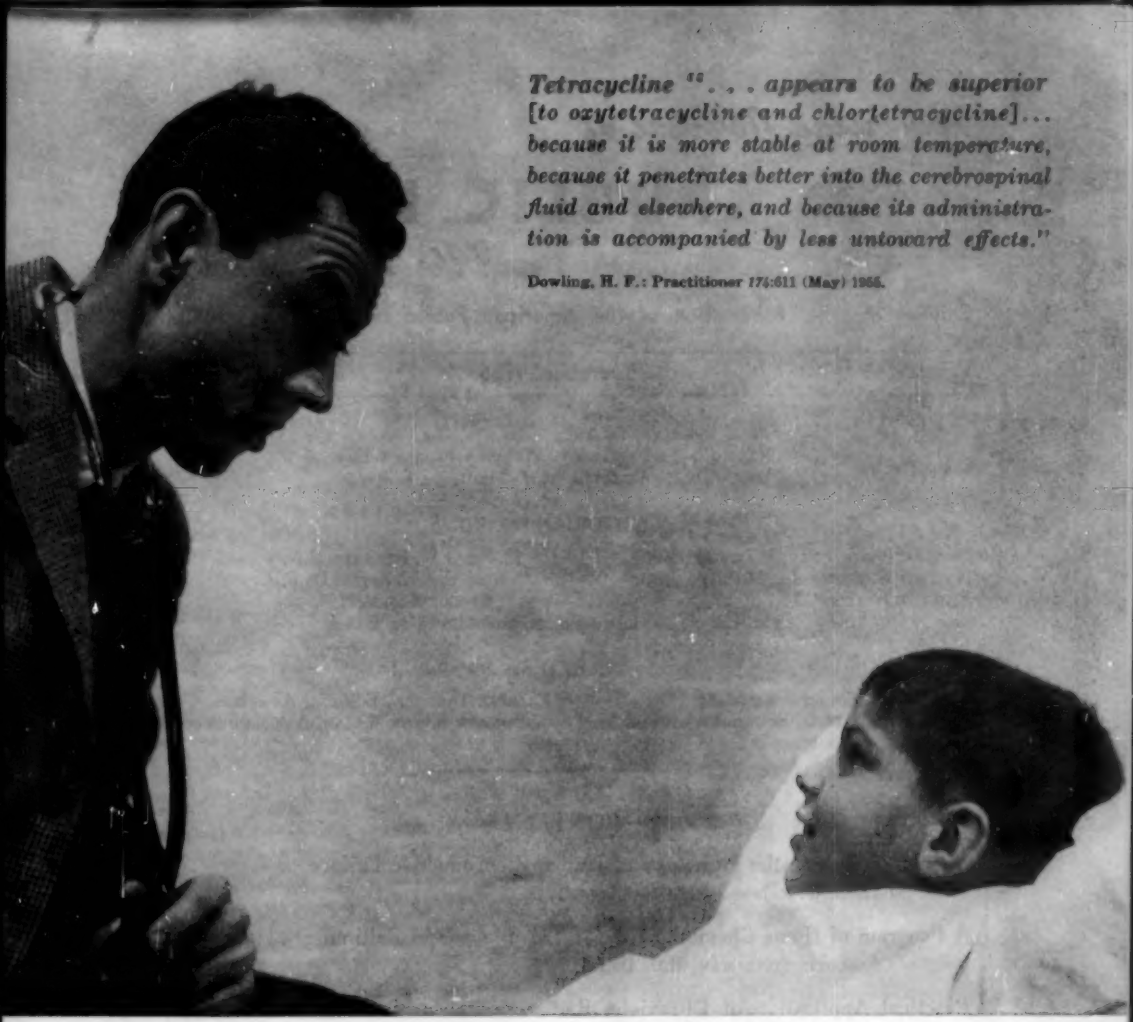

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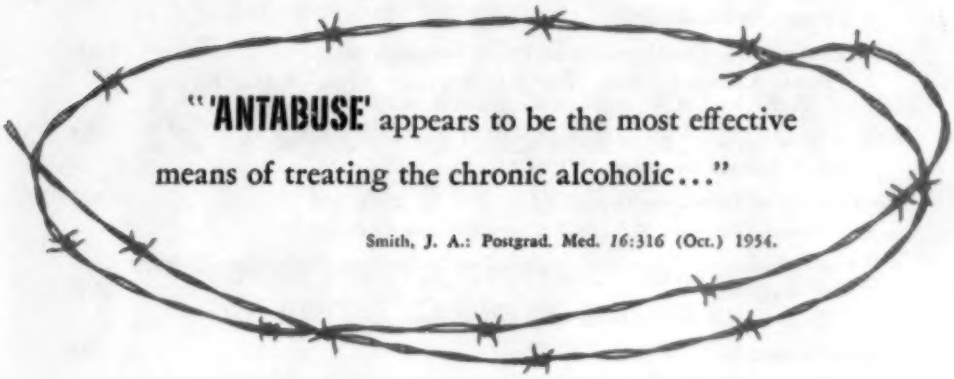

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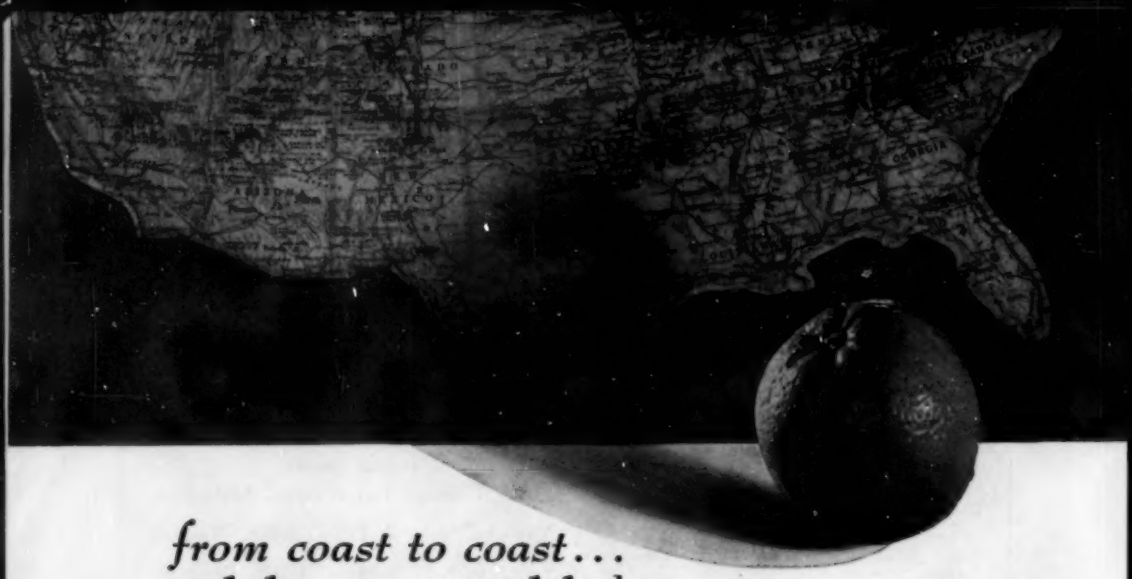

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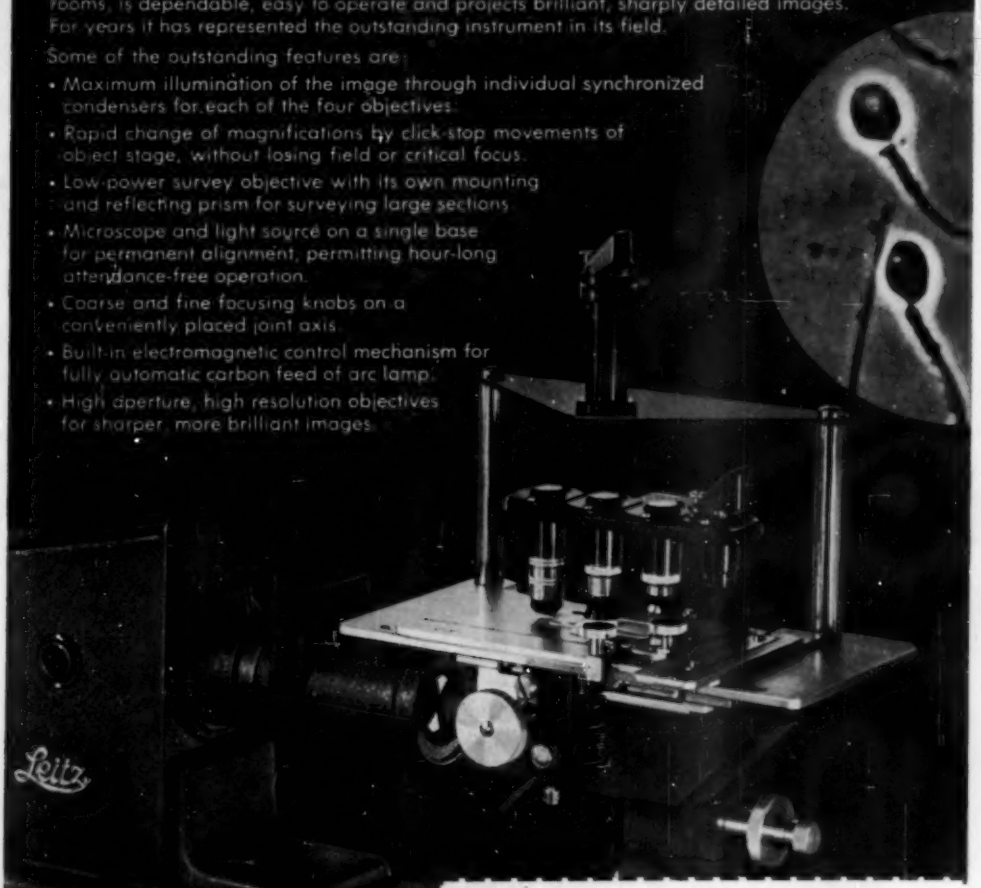

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1. Smith, C. A., and others: Am. J. Syph., Gonor. & Ven. Dis. 38:136 (March) 1954. 2. Council on Pharmacy and Chemistry: New and Nonofficial Remedies. J. B. Lippincott Co., Philadelphia, 1954, p. 148.

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by Science Writer

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History. The history of vitamin C is fascinating. Scurvy was once the most prevalent disease in Europe. In the 18th Century the antiscorbutic value of fresh vegetables and citrus fruits was recognized.

Isolation. It was not until 1918-25 that almost pure ascorbic acid was concentrated from the lemon by Zilva and its important properties and molecular composition established. In 1927 he concluded that this so-called "reducing factor" and the antiscorbutic principle were closely related. In 1928, Szent-Györgyi, who started investigations in 1921, isolated a strong reducing compound from adrenal glands, oranges, cabbage, terming it "hexuronic acid."

Chemistry. The "reducing factor," "hexuronic acid," and vitamin C were all identified as the same in 1932 by various groups of workers. This was one year after C. G. King established the chemical identification of vitamin C.

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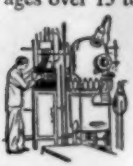

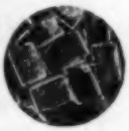

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Ascorbic acid is present in many foods. Nature supplies some with lavish amounts and stints on others. In fact, wide variations* have been found in the vitamin C content in varieties of the same fruit.

Deficiencies. Many surveys have shown widespread vitamin C deficiencies in the population. Physicians may call these subclinical, but they are deficiencies nevertheless.

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Requirements. The U. S. Food & Drug Administration has set 30 milligrams as the adult minimum daily requirement of ascorbic acid. This daily intake is just about sufficient to prevent recognizable signs of vitamin C deficiencies although a subclinical or an unrecognized deficiency may exist. In view of this, the National Research Council has established 75 milligrams as the recommended daily male adult allowance and 70 mg. daily for female adults, which levels are supported by many controlled nutrition studies. However, the N. R. C. recommends 90 mg. daily for boys between 13 and 15, 100 mg. daily for boys between 16 and 20, and 150 mg. daily for lactating women.

This article is published in the interests of pharmaceutical manufacturers and food processors who make their good products better with essential, health-giving vitamin C. Reprints are freely available. Vitamin Division, Hoffmann-La Roche Inc., Nutley 10, New Jersey. In Canada: Hoffmann-La Roche Ltd., 286 St. Paul Street, West; Montreal, Quebec.

*The table shows minimum and maximum levels of ascorbic acid in commercially canned juices. All figures are in milligrams per 100 grams of juice. Data from U. S. Department of Agriculture.

	Min.	*Max.*
Apple juice	0.2	3.6
Grape juice	0.0	4.7
Grapefruit juice	10.0	49.0
Orange juice	9.7	70.0
Pineapple juice	5.4	18.0
Tomato juice	2.5	32.0

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A medical journal article reported that the entire pancreas, except the portion called the islets of Langerhans, could atrophy without the patient's contracting diabetes.

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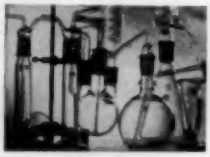

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By H. C. Schaefer, Director Purina Laboratory Chow Research

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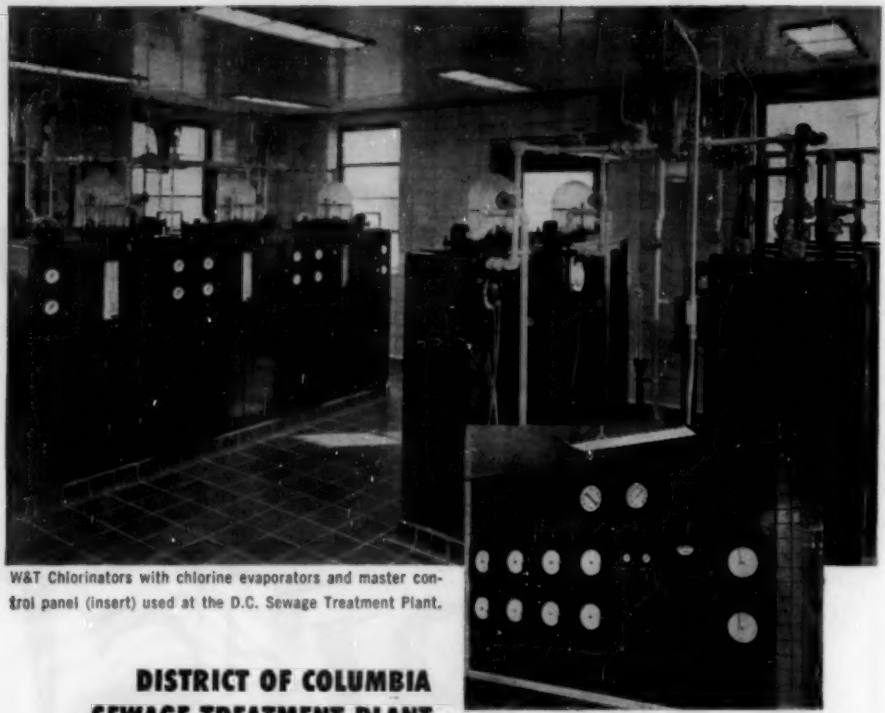

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Current Trends in the Pathology of Human Reproductive Failure

GEORGE W. ANDERSON, M.D.

Presented here is a concept of immediate concern to pediatricians, obstetricians, maternal and child health and crippled children's program administrators, epidemiologists, and statisticians. It is the need for a team approach by a variety of disciplines simultaneously employing clinical, laboratory, and field technics to the solution of the problems of perinatal mortality.

From the time of Virchow the integration of structure and function has been imperative in the study of disease in the science known as pathology. This broad concept could be frustrating to the usual student of pathology since it embraces practically all the various basic medical sciences. In recent years specialization has not only confronted the clinician and practitioner of medicine, but similar trends are observed in the field of general pathology. It has become obvious that obstetrics and gynecology the clinical specialty charged with the initial responsibility of human reproduction, has special problems which could be best solved by men trained in this particular branch of pathology. The clinical field of obstetrics and gynecology however, changes so rapidly that a definition of obstetric and gynecologic pathology in the year 1954 might not apply a few years hence.

It is the clinician's problems which should dominate and direct the activities of the majority of research pathologists. For example, in obstetrics the reduction of maternal mortality has transferred the interest of the clinician into special areas, such as sterility, abortion, endocrinology, and fetal and neonatal deaths. A number of converts to the field of fetal or neonatal pathology as a special discipline have resulted. Although the term "fetal pathology" is satisfactory, I suggest as an alternative term for this branch of science, the Pathology of Human Reproductive Failure. A definition of such a science would be: that branch of medicine concerned with deviations of the reproductive process which do not

Dr. Anderson is assistant professor of obstetrics, Department of Obstetrics, Johns Hopkins University Hospital and Medical School, Baltimore, Md.

This paper was presented before a Joint Session of the Epidemiology, Maternal and Child Health, and Statistics Sections of the American Public Health Association at the Eighty-Second Annual Meeting in Buffalo, N. Y., October 12, 1954.

Table 1—An Estimate of the Scope of the Pathology of Human Reproductive Failure U. S. Vital Statistics (1950)

Immediate Problem	
Deaths in first 28 days of life	72,855
Fetal deaths	68,262
Spontaneous abortions (10 per cent)	362,241
Criminal abortions (6 per cent)	217,344
Ectopic pregnancies	22,640
Aftermath or "Continuum"	
Cerebral palsy	21,369
Epilepsy	7,244
Mental retardation	18,110
Blindness	822
Deafness	5,000
Cleft palate and cleft lip	4,708
Congenital hip and heart disease	?
Facial asymmetry (Boder)	....
Total	800,595
Total births in the United States in 1950	3,622,411

culminate in a healthy mother and a healthy child. This, of course, depends on a broad definition of health, which at the present time would include an accurate, harmonious, and constant integration of all necessary biochemical factors in the body of the mother and her growing fetus. Disorganization of any of these biochemical systems results in altered structure in the tissues of mother or fetus and therefore falls within the province of the pathology of human reproductive failure.

In support of this definition the leading causes of perinatal deaths will be offered as an estimate of reproductive failure in the United States. Then, the present status of one or two special problems in this field will be discussed. And finally, using a pathologist's privilege, a few trends and basic needs in the pathology of human reproductive failure will be pointed out.

An estimate of the scope of the pathology of human reproductive failure can be seen in Table 1. The data for this list has been taken from the U. S. Vital Statistics (1950), and in many instances is based on speculation applying local population area data to the entire United States. The immediate problem includes fetal and neonatal mortality, plus abortions and ectopic pregnancies. However, in the past few years, Lillienfeld, Parkhurst, and others, have shown that complications of pregnancy which yield a higher combined infant loss also seem to be associated with cerebral palsy, epilepsy, and mental retardation. This suggests an aftermath or "continuum" of the reproductive failure problem, with a lethal component consisting of abortions, stillbirths and neonatal deaths, and a sublethal component consisting of cerebral palsy, epilepsy, and mental retardation. An approximate estimate for human reproductive failure would approach the figure of 800,595 losses. This is an imposing figure when compared to the 3,622,411 total births in the United States during the year 1950.

As can be seen in Table 2, if one puts reproductive failure in its proper

Table 2—Comparison of the Major Causes of Death and Reproductive Failure in the United States U. S. Vital Statistics (1950)

Cause of Death	Number
Diseases of cardiovascular system	745,074
Diseases of the Heart	535,705
Malignant neoplasms	210,733
Diabetes	24,419
Tuberculosis	33,959
Motor vehicle accidents	34,763
All other accidents	56,486
Suicide	17,145
Homicide	7,942
Maternal deaths	2,960
Poliomyelitis	1,904
Reproductive failure	800,595

position in comparison to the major causes of death, we have a compelling reason for interest in this problem. The data lend support for a single descriptive term which will encompass the loss of the products of conception at any stage before full maturity, and is best portrayed by the term Human Reproductive Failure. Using the statistical approach as a background, the basic divisions of the pathology of the human reproductive failure can then be outlined as in Table 3. This is a formidable list consisting of the immediate problem with such subjects as maternal death, sterility, ectopic pregnancy, abortion, and perinatal mortality; and the "aftermath" or "continuum," including cerebral palsy, epilepsy, mental retardation, blindness, deafness, numerous congenital defects, which do not kill in the fetal or neonatal period, certain types of tumors which are associated with the reproductive processes, and the medical diseases associated with pregnancy. Here is a large

Table 3—Basic Divisions of the Pathology of Human Reproductive Failure

Immediate Problem
1. Maternal death
2. Sterility—infertility
3. Ectopic pregnancy
4. Abortion
5. Placenta
6. Hydatiform mole
7. Chorionepithelioma
8. Perinatal mortality
Aftermath or "Continuum"
9. Cerebral palsy
10. Epilepsy
11. Mental retardation
12. Blindness
13. Deafness
14. Congenital heart—cleft palate, etc.
15. By-product tumors of the reproductive process
16. Associated medical diseases of pregnancy

Table 4—Classification of Perinatal Death (Over 1,000 gm) Johns Hopkins Hospital (1937–1949)

Cause of Death	Fetal Deaths		Neonatal Deaths		Perinatal Deaths Number	Per cent
I. Anoxia		249		102	351	33.7
Placenta	92		40		132	
Cord	35		10		45	
Maternal complications	27		9		36	
Complications of labor	66		20		86	
Other	29		23		52	
II. No abnormal state		228		106	334	32.0
Without maternal disease	169		84		253	
With toxemia	45		13		58	
Other acute or chronic disease	0		3		3	
Diabetes	14		6		20	
III. Birth injury		24		78	102	9.8
IV. Malformation		42		56	98	9.4
V. Abnormal pulmonary ventilation		0		74	74	7.1
VI. Infection		10		48	58	5.6
Syphilis	7		6		13	
Other infection	3		42		45	
VII. Erythroblastosis		6		11	17	1.6
VIII. Other conditions or causes		8		1	9	0.8
Total		567		476	1,043	100.0

amount of pathologic material which is often examined in a haphazard and disorderly fashion in many medical institutions.

Present Status of the Leading Causes of Perinatal Deaths

It will be possible to discuss only a few aspects of perinatal death. The causes of death in the Johns Hopkins Hospital from 1937 to 1949 are illustrated in Table 4. Here it can be seen that the major causes of death include anoxia, no abnormal state, birth injury, malformation, abnormal pulmonary ventilation, and infection. Let us examine the current status of a few of these major causes of death. The types of congenital malformations incompatible with life of babies over 1,000 gm born in the Johns Hopkins Hospital from 1937 to 1949 are illustrated in Table 5. This group of 99 cases confirms what has been known in the past that the central nervous system comprises the major percentage (49.5 per cent), followed by cardiovascular (17.2 per cent), multiple (13.1 per cent), and musculoskeletal (9.1 per cent) types of malformation. Detailed analysis of the maternal histories in these 99 cases revealed only one case in which measles was present during the first 20 weeks of pregnancy, and this proved to be the only specific factor which could be elicited in the histories of the mothers having these 99 infants. Despite amazing strides in the field of experimental embryology by such workers as Warkany, Ingalls, and others, the clinical investigation of human malformations is a complicated problem at the present time.

Table 5—Types of Congenital Malformations Incompatible with Life (Over 1,000 gm) Johns Hopkins Hospital, 1937–1949

Type of Malformation	Cases	Per cent
Central nervous system	49	49.5
Cardiovascular	17	17.2
Multiple	13	13.1
Musculoskeletal	9	9.1
Gastrointestinal	5	5.1
Genitourinary	4	4.0
Other	2	2.0
Total	99	100.0

The subject of birth injury deserves special consideration. With refinements of the mechanical factors, such as the wiser selections of cases for pelvic delivery, dural tears, and subdural hemorrhages are being reduced to a minimum. At the present time brain hemorrhages are divided into those generalized subdural hemorrhages which are due to the stress and strain of the birth act and the subarachnoid and ventricular hemorrhages interpreted at the present time as the result of intrauterine anoxia. No one questions that direct trauma can cause diffuse and focal damage to the infant's brain. There is great difficulty, however, in assessing the possible roles of traumatic or anoxic damage in any given child, as is perhaps best exemplified by the increasing number of papers bearing on this point.

One type of brain hemorrhage which has a debatable status because of its past history is the small petechial hemorrhage into the brain substance itself. Schwartz described these lesions in detail in 1924. He also emphasized that they were often located in the central white matter and basal ganglia of the forebrain. He concluded that very few infants failed to have some degree of petechial hemorrhage in their brains. Numerous other investigators have corroborated the presence of these capillary hemorrhages and for a period of time they were considered to be normal phenomena. Recent studies on the brain in regard to the presence or absence of this type of hemorrhage are

infrequently reported, but it is the impression of this author that intracerebral petechial hemorrhages are not as common as previously thought.

The effects of anoxia on the human newborn brain have been known and reported. Clifford in his study on the effects of asphyxia on the newborn infant described cerebral edema in seven infants' brains and small areas of hemorrhage in three cases. One infant showed encephalomalacea and another demonstrated cerebral ganglion cell degeneration. Courville has been most convincing in his support of the idea that a number of chronic disease states which make their appearance during infancy and early childhood, have their genesis in neonatal "asphyxia." In this group of lesions are included cortical scars, atrophic lobar sclerosis (ulegyria), cerebral hemiatrophy, diffuse atrophy of the brain, chronic progressive degeneration of the cerebral gray matter, porencephaly, chronic infantile cystic degeneration of the cerebral white matter, the demyelinating diseases of infancy and childhood, and the striatal diseases, such as status marmoratus and status demyelinatus. Courville feels that the inherent characteristics of the lesions themselves suggest their anoxial origin.

Most studies on fetal or newborn brains have been primarily concerned with gross hemorrhagic phenomena. Few studies have been conducted with information comparable to the studies in adults in the observations made by Haymaker and Lewis on high altitude anoxia. Their findings consisted of hemorrhages in the cerebral cortex, subcortical white matter, and periventricular region, including the floor of the fourth ventricle. Edema, particularly perivascular sponginess, was a conspicuous feature. Anatomical verification of Courville's contention in the fetus and newborn would make the medical profession, particularly the obstetrician, focus more attention on the prevention of anoxia, not only as a cause of death but also a cause of neurologic sequelae in the infant and child.

In an effort to develop a modern concept of the ways that birth processes affect the fetal and newborn brain a study is now in progress in the Department of Obstetrics of the Johns Hopkins Hospital which may shed some light on this problem. Autopsies (including the brain) are obtained on almost every infant (over 400 gm in weight) born dead or dying in the first 28 days of life. The brains are removed and described carefully. Then the brains, other than those from deaths in utero that do not lend themselves for microscopic study, are embedded completely in celloidin. Coronal sections of the brain are cut as follows: Five sections at 40 microns, followed by four sections at 200 microns, which represent nine sections for every millimeter of fixed brain or 90 sections for every centimeter of brain tissue. For the average full-term brain this totals approximately 1,000 to 1,500 serial sections. The celloidin sections are numbered and an alternating sample of these 1,000 sections, about 100–150 sections are stained. The thick sections (200 microns) have special vascular stains applied, and the thin sections are stained with a Nissl preparation. In this manner either vascular injuries, distribution, or pattern, and histologic cell detail can be studied thoroughly. It is hoped that this type of procedure will give us systematic data in regard to the effect of birth processes under normal and pathologic conditions.

No discussion of perinatal mortality would be complete without some mention of the subject of prematurity. Here a great deal of time and thought have been placed on such general questions as nutrition, race, and economic status. It may well be that the underlying cause of prematurity is much

more specific in nature. The author has been fascinated by the work of Csapo and others who have shown that in a smooth muscle organ, such as the uterus, it is the cell and its metabolism which are the basic mechanisms involved in functional myometrial disorders.

Since there appear to be no easy solutions to the causes and prevention of reproductive failure, we may profitably examine some of the current trends and possible avenues of future investigations. At the beginning of the twentieth century the concern for reproductive failure was that of curiosity and superstition, primarily directed to description of monstrosities. In the period between 1920 and 1940 the basic statistical and classification studies were made. During the past 10 to 15 years modern chemistry and physiology have caused amazing changes in the medical approach to the investigation of disease processes, not only in the reproductive area, but also in the diseases of adults.

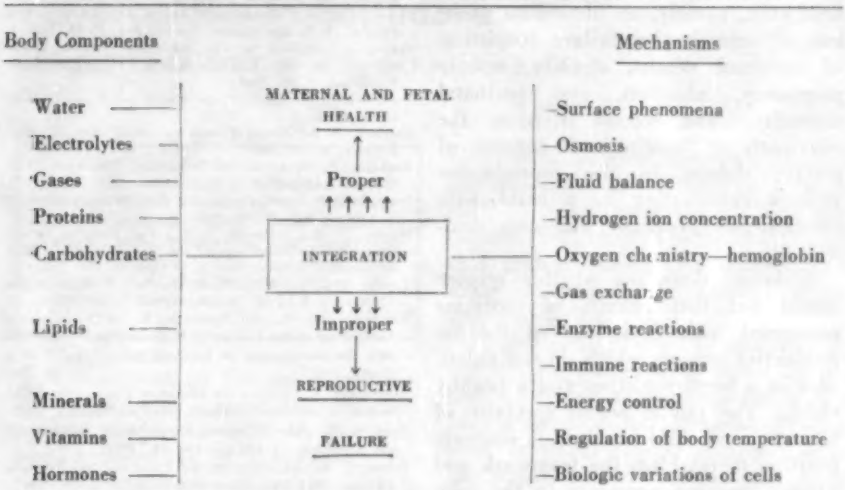
Medical research in the past has been mainly concerned with the infectious diseases and improvements in modern surgery. With the sweeping advances in the control of infection, the diseases of the extremes of life, namely aging and reproductive failure have become the practicing physician's problems. This perception of relationships between basic sciences and clinical medicine welded into a dynamic concept has been nicely portrayed by Page. Borrowing from his concept on the integrated application of multiple basic sciences in modern research, a rough analogy may be illustrated as in Table 6 of the studying of the aging process of arteriosclerosis and its resemblance to so-called placental senescence which may play a role in fetal death. The study of placental function follows this pattern and perhaps answers to the problem of arteriosclerosis may aid in the interpretation of some of the histologic changes of the villus structures.

Among other interesting biologic variations and mechanisms that are poorly understood in the field of reproductive failure is the amazing ability of the fetus to live and grow in its maternal environment. This is per-

Table 6—An Integrated Application of Multiple Basic Sciences to the Problems of Modern Research (Page)

Diseases of Aging (Arteriosclerosis) or Placental Senescence (Fetal Death) Mechanisms	Basic Science Involved
1. Basic elements	Nutrition
Lipids and proteins from food	Biochemistry
Endogenous synthesis	
2. Organization of lipids to lipoproteins	Physical Chemistry
3. Transport mechanisms	Histology—Anatomy
4. Filter Bed	Heredity—Anatomy
5. Lateral anterial pressure	Physiology
6. Intramural capillary hemorrhage	Pathology
7. Turbulence in the blood column predisposes to lipid deposition	Biophysics
8. Fibroblastic and ground substance reaction determine the fate of the vessel	Embryology Chemistry
9. Age, sex, diet, and heredity constitute the factors which condition the substrate to produce atherosclerosis	Clinical Medicine

Table 7—Adaptation or Biochemical Integration in Reproductive Failure



haps one of the best examples of the "adaptation" concept of Selye. Eastman, in his essay on "Mount Everest in Utero," has illustrated how the fetus in utero adapts to an oxygen environment comparable to an adult human being at approximately an altitude of 33,000 feet. This is accomplished by a series of chemical changes involving hemoglobin. However, this is only one of several interesting phenomena of adaptation which the fetus possesses. In Table 7 a partial list of these mechanisms are portrayed, as well as the incorporation of the body and cell components, such as proteins, fats, etc., working together in proper integration to produce maternal and fetal health, or improperly balanced to result in reproductive failure.

Finally, and what may be obvious to many, is the concept that the basic histopathology of human reproductive failure strikes at the level of the capillary. The fibrinoid deposition in the placenta, the hyaline membrane in the lung, capillary injury in anoxia and retrolental fibroplasia, and the blood brain barrier problem in brain injury are all examples of hematoparenchymal pathology and the capillary permeability pathology of Eppinger. Restricted scientific training has produced many advantages in the past, but a plea for more logistic thinking must be kept paramount if progress is to be made in the pathology of human reproductive failure.

Summary

Through a series of logical and sequential steps a special branch of science known as the pathology of human reproductive failure reveals itself as deserving of your consideration. Its development has closely paralleled the clinical specialties of obstetrics, gynecology, and pediatrics. In the past maternal mortality dominated this field. Recent changes in obstetrics have transferred the research potential of this science to fetal and neonatal pathology. At the present

time two basic divisions of this new field exist, namely, an immediate problem of reproductive failure consisting of maternal deaths, sterility, ectopic pregnancy, abortion, and perinatal mortality. The second division, the aftermath or "continuum," consists of certain defects in the reproductive process culminating in a child with cerebral palsy, epilepsy, blindness, deafness, etc.

A broad definition of this science would be: that branch of medicine concerned with deviations of the reproductive process which do not culminate in a healthy mother and a healthy child. The public health specialty of maternal and child health is in strategic position to establish the teamwork and project research necessary in the solution of future problems in the pathology of human reproductive failure.

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Cardiovascular Training Center for Nurses

A pilot Cardiovascular Training Center for Nurses will be established at the University of Minnesota School of Public Health on January 1, 1956, by the Public Health Service. Cooperating in the project are the Minnesota Department of Health, the University of Minnesota School of Public Health, and other agencies in Minneapolis and St. Paul which will offer trainees field experience in special services for cardiovascular patients. The aim, according to Gaylord Anderson, M.D., director of the school, is "to give nursing leaders a better understanding of new developments in the cardiovascular field and of how to apply these developments to the nursing care of patients, both in the home and hospital."

Nurses for the first group to train at the center will be drawn mainly from the consultant, supervisory, and instructor positions. Candidates will be accepted to represent the various fields of nursing—hospital, industrial, nursing education, and public health—as well as different sections of the country. Applications for the Training Center are being received at the University of Minnesota School of Public Health.

A Program of Home Chemotherapy for Tuberculosis in Baltimore

CHARLOTTE SILVERMAN, M.D., Dr.P.H., F.A.P.H.A.

That the experience reported here, in the home treatment of tuberculosis patients with antimicrobial drugs, was successful can scarcely be questioned. The practical implications of the demonstration are clear and useful.

It is intended in this paper to evaluate the effect of a home chemotherapy program begun in 1952 on mortality from tuberculosis in Baltimore. The two-year mortality experience of a group of patients who received antimicrobial drugs at home is compared with that of a group for whom home treatment was not available.

Within the past few years, chemotherapy outside of hospital has been found a feasible procedure on more than an individual basis. Although the desirability of instituting such programs has been questioned, there have been compelling reasons for considering drug treatment without hospitalization. The indications for embarking on a home treatment program differ from area to area as do the methods of conducting such programs and the means of measuring their effects. Stocklen [1] in Cleveland described the initiation of an outpatient chemotherapy program because of long waiting lists for hospitalization and found that treatment in the clinics resulted in a large proportion of improvements as well as the elimination of the need for hospitalization in many cases. In New York City, Robins and his associates [2, 3] have reported clinical and x-ray improvement and sputum conversions resulting from oral chemotherapy of ambulatory patients whose advanced disease was unsuitable for collapse or surgical therapy. Bundy [4] has described the Pittsburgh plan of early discharge from hospital with subsequent continuation of chemotherapy at a central clinic which resulted in a sharp decrease in the hospital admission waiting list.

In Baltimore, a city of approximately one million residents of whom 25 per cent are Negro, tuberculosis has always been a major cause of death. The decline in death rate from this disease has lagged behind the decreases noted in other large cities in this country. In 1952, the year of this study, the mortality rate for tuberculosis was 43.2 per 100,000 for the total population of the city, 24.1 for white residents and 100.5 for Negroes—rates far above the national average. Inadequate hospital facilities, poor housing and economic conditions in many sections of the city, and high case fatality rates among Negroes are some of the factors which have perpetuated the gravity of this disease problem.

Because of discouragingly long waiting periods for sanatorium admission, with no immediate prospect of relief from new hospital construction, it was thought important to make use of what appeared to be a practical plan for initiating specific treatment promptly. This was particularly important for our many Negro patients for whom delay in hospital admission was most costly in the form of rapid progression of disease and the widespread dissemination of tubercle bacilli to their contacts. The

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home treatment program in Baltimore, then, was undertaken principally to make possible prompt specific treatment for tuberculous patients pending sanatorium admission. The program also included persons with nonpulmonary tuberculosis, regardless of the necessity for hospitalization, and some discharged hospital patients who were ready to return to the community but required long-term chemotherapy.

During the first five months of 1952, small sums of money were expended from the regular budget of the Bureau of Tuberculosis for the purchase of drugs for the home treatment of a small group of patients waiting for hospital admission. This group consisted of 49 persons with active pulmonary disease, all but two of whom were Negro. All of them were selected because of acute illness, intolerable living conditions or size of family exposed. In June, 1952, as the result of a resolution presented to the City Council of Baltimore by the Cherry Hill Health Council (a community agency in south Baltimore interested in health problems) an appropriation of $10,000 for the purchase of antituberculosis drugs was approved by the Board of Estimates for the duration of the calendar year. This action made possible the administration of chemotherapy at home to an additional 361 tuberculous patients from June 1 through December 31, 1952. The total number treated during the entire year therefore was 410 of whom 109 were white patients and 301 Negro. Of the white patients who received chemotherapy at home, 65 had newly diagnosed disease and 44 suffered exacerbations of previously known tuberculosis; among the Negro patients, 231 had come to diagnosis for the first time and 70 had experienced relapses. Of the entire group treated, 93 per cent had pulmonary disease of which 76 per cent were moderately advanced or far advanced in extent.

Description of Program

The decision to offer home chemotherapy was made in each case by the director of the Bureau of Tuberculosis after consultation with clinic and attending physicians and with public health nurses. Medications were offered to all patients who it was believed would benefit from such treatment but who were themselves unable to pay for the drugs. To insure widespread coverage of Negro patients, it was planned from June 1 through December 31, 1952, to give home chemotherapy to every newly reported Negro patient for whom drug therapy was thought indicated, if he could not purchase private medical care.

Submission of an application for hospitalization was a requirement for admission to the program but refusal to accept a hospital bed when it became available was not reason in itself for discontinuing chemotherapy. After initial chest x-ray and bacteriological examinations, patients on this program were referred to city chest clinics, hospital dispensaries, or other examining facilities where they were known, for monthly examinations and x-rays. Sputum or stomach washing specimens were submitted for examination approximately every two months by those patients with pulmonary disease. Drug sensitivity tests were not done except in a few instances on request. All persons on the drug program were instructed to remain in bed at home while their disease was active (a procedure followed for all tuberculous patients regardless of their inclusion in this program).

The plan of therapy was uniform and involved the administration of one gram of streptomycin intramuscularly twice weekly and 12 grams of sodium para-aminosalicylic acid orally each day. The public health nurses of the City Health Department visited the

homes of all patients in the program twice each week to administer streptomycin and leave supplies of PAS. With no increase in nursing personnel, these generalized public health nurses gave exceptional service. Home nursing visits to the tuberculous increased by 10,000 during the year, a situation made possible by more careful selection in nursing visits for other bureaus of the Health Department. The nurses of the Instructive Visiting Nurse Association gave valued assistance by assuming the treatment regime for nonpulmonary cases.

While it is not the purpose of this report to evaluate the effect of home chemotherapy on clinical condition, chest x-ray findings or bacteriological status, it is worth pointing out that many of the patients not only survived their waiting periods for hospitalization which formerly would have been unlikely, but also improved sufficiently to be favorable candidates for successful treatment when admitted to hospital. There were also some who no longer required hospitalization when a bed became available. In addition, the morale of the sick, their family members, and even our public health nurses was immeasurably improved.

Method of Investigation

Selected for consideration in this study were all cases of active or probably active tuberculosis among Negroes reported to the City Health Department for the first time from June 1 through December 31, 1952, when the home treatment program was in full operation, and a corresponding group of cases reported consecutively during the preceding year of 1951 when a home therapy program was not available. Negro groups were chosen for investigation because the high fatality rates among them favor a significant mortality study. The data were taken from the case register of the Bureau of Tuberculosis and there was no reason to believe that the diagnoses made in 1952 and 1951 by similar groups of reporting physicians were not comparable.

During the last seven months of 1952 there were 356 cases of active or probably active tuberculosis among Baltimore Negroes reported to the Health Department, and in the same period of time in 1951, notifications of 330 such cases were received. Of these two groups totaling 686 patients, all but 29 patients (4.2 per cent) were followed for two years or longer, at least to the extent of determining whether they were alive two years after registration. Among the 29 cases not followed for two years there were 14 in the 1952 group and 15 in the 1951 group. Of the 14 patients in the 1952 group, 10 were followed for six to 23 months and four were lost to observation within six months after registration. Of the 15 registrants in the 1951 group, there were 11 who were observed for six to 23 months and four who could not be traced soon after diagnosis.

There were no important differences between the 1952 and 1951 groups with respect to month of registration, residence in various districts of the city, or percentage of cases by sex-age distribution. The composition of the two groups according to diagnosis and sex is presented in Table 1 which shows that significantly more males than females were registered in 1952 than in 1951, but that there were no important differences in the proportion of total cases in the various diagnostic categories, although there was some excess of far advanced cases in 1952.

The proportion of patients already in hospital when diagnosed and registered, those for whom hospitalization was not recommended, those declining to apply for admission, and those no longer needing hospital care when it became available were alike in 1952 and 1951. Ap-

Table 1—Reported Cases of Tuberculosis Among Negroes by Diagnosis and Sex, Baltimore, Md., June 1–December 31, 1952, and June 1–December 31, 1951

Diagnosis at Registration	1952—Reported Cases					
	Total		Male		Female	
	Number	Per cent	Number	Per cent	Number	Per cent
Minimal	47	13.2	24	11.1	23	16.5
Moderately Advanced	98	27.5	62	28.6	36	25.9
Far Advanced	101	28.4	73	33.6	28	20.1
Primary	46	12.9	18	8.3	28	20.1
Other Pulmonary *	34	9.6	24	11.1	10	7.3
Nonpulmonary	30	8.4	16	7.3	14	10.1
Total	356	100.0	217	100.0	139	100.0
	1951—Reported Cases					
Minimal	53	16.1	33	19.0	20	12.8
Moderately Advanced	88	26.7	57	32.7	31	19.9
Far Advanced	79	23.9	40	23.0	39	25.0
Primary	51	15.4	24	13.8	27	17.3
Other Pulmonary *	27	8.2	8	4.6	19	12.2
Nonpulmonary	32	9.7	12	6.9	20	12.8
Total	330	100.0	174	100.0	156	100.0

* Includes miliary tuberculosis and pleural effusion.

proximately the same proportion of patients was hospitalized within six months of submission of an application in 1952 as in 1951, although refusals to accept hospital admission were more frequent among the 1952 registrants.

Description of Treated Cases

Table 2 presents by original diagnosis all newly reported cases of tuberculosis among Negroes during the last seven months of 1952, with the number and proportion of those treated in the home chemotherapy program within six months of registration. The diagnosis of "other pulmonary" tuberculosis includes miliary infiltrations of which there were 15 (with concomitant meningitis in three of them) and cases of pleural effusion. "Nonpulmonary" tuberculosis encompasses lymphadenitis,

Table 2—Reported Cases of Tuberculosis by Diagnosis and Proportion Treated on Home Chemotherapy Program, 1952

Diagnosis at Registration	Reported Cases in 1952			Percentage of Reported Cases Treated
	Total	Number Treated	Number Not Treated	
Minimal	47	14	33	30
Moderately Advanced	98	62	36	63
Far Advanced	101	63	38	62
Primary	46	7	39	15
Other Pulmonary	34	16	18	47
Nonpulmonary	30	10	20	33
Total	356	172	184	48

renal disease, bone involvement, and meningitis without serious pulmonary disease in three cases.

Home chemotherapy was made available to 172 or 48 per cent of the 356 newly reported cases in 1952 within six months of registration. This group of 172 represented all the patients available and suitable for home chemotherapy except 11 who were omitted through oversight. Of the remaining 173 registered cases, 65 were in hospital or admitted immediately after registration, 26 were receiving chemotherapy in other clinics or privately, six returned to their home states, 11 died before chemotherapy could be started, two refused treatment, four disappeared from observation shortly after registration, and 59 were not in need of home chemotherapy.

It was the plan to start chemotherapy as soon as feasible after registration. Of those placed on the program, one-third were started during the first week, one-half within the first two weeks, and two-thirds within the first month. Approximately two-thirds of the moderately advanced and far advanced cases of pulmonary tuberculosis were treated through this program. A smaller proportion of minimal and primary cases required such therapy. This was also the case with other types of pulmonary disease and nonpulmonary involvement.

The duration of home therapy varied from less than one month to more than 24 months. For two-thirds of those on the program (114 patients), the availability of a hospital bed after an average of four months of treatment was the reason for discontinuing drug therapy. Eleven patients (6 per cent of the total treated group) would not cooperate sufficiently to make treatment worth while and so were removed from the program after an average of less than four months of therapy. Five patients (less than 3 per cent) had untoward reaction to streptomycin or PAS severe enough to require discontinuance of the drug, generally within two months of initiation of therapy. There were nine patients (5 per cent) who died while receiving initial chemotherapy at home, generally during the first month of treatment. Five patients left the city or arranged for treatment elsewhere after several months of therapy. Twenty-four of those on the program (14 per cent) had received sufficient chemotherapy for their illnesses after an average of nine months of therapy, and four were still receiving medications at the end of the study period, with an average of 22 months of therapy.

Results

Two years after registration, 40 tuberculosis deaths had occurred among the 356 new cases reported among Negroes in 1952 when a home chemotherapy program was in operation, while 80 such deaths had taken place among the 330 new cases reported in 1951 when there was no home chemotherapy program.

Of interest is the time interval after registration during which these deaths occurred. During the first two months after diagnosis there was no essential difference between the two groups. During the third month after registration, however, marked differences in mortality appeared in favor of the 1952 cases. These differences were observed through the sixth and twelfth months of observation, as shown in Table 3 in which the deaths for the entire two-year period of the study are enumerated by half-year intervals. After one year, the number of deaths in the two groups was essentially similar.

By the life-table method (see example shown in Table 4), time-specific fatality rates according to original diagnosis were computed and form the basis for the cumulative fatality rates pre-

Table 3—Deaths from Tuberculosis at Six-Month Intervals After Registration, According to Diagnosis, 1952 and 1951

Diagnosis at Registration	Number of Cases		Number of Deaths									
			Time Interval in Months									
			0–6		6–12		12–18		18–24		Total	
	1952	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952	1951
Minimal	47	53	0	2	0	2	0	0	0	1	0	5
Moderately Advanced	98	88	6	13	1	9	0	2	0	1	7	25
Far Advanced	101	79	17	32	3	7	4	2	1	2	25	43
All Other	110	110	6	7	1	0	1	0	0	0	8	7
Total	356	330	29	54	5	18	5	4	1	4	40	80

sented in Table 5. As in Table 3, deaths from primary tuberculosis, "other pulmonary" tuberculosis and nonpulmonary tuberculosis have been combined into "all other" because the numbers were small and differences between the two groups were not apparent.

The total cumulative fatality rate from tuberculosis two years after registration of the 1952 group was 11.4 per cent; whereas the rate for the 1951 cases was 24.6 per cent, more than a twofold difference in favor of the 1952 group. The most marked differences were observed among cases of moderately advanced pulmonary tuberculosis for whom the 24-month cumulative fatality rate was 7.2 per cent in the 1952 group and 28.4 per cent in the 1951 population. This represented a 75 per cent reduction in fatality rate for moderately advanced cases in 1952 as compared with 1951. Far advanced pulmonary cases experienced a rate of

Table 4—A Life Table for Reported Cases of Tuberculosis Among Negroes, Baltimore, June 1–December 31, 1952

Months Following Registration x	Number Under Observation at Beginning of Period l_x	Number Lost to Observation During Period w_x	Deaths from All Causes d_x	Probability of Dying in Interval q_x	Deaths from Tuberculosis d'_x	* q'_x	$(1-q'_x)$ p'_x	† P'_x
0–6	356	4	33	9.32	29	8.2	91.8	100.0
6–12	319	4	6	1.89	5	1.6	98.4	91.8
12–18	309	3	6	1.95	5	1.6	98.4	90.3
18–24	300	3	3	1.00	1	0.3	99.7	88.9
								88.6

* $q'_x = \frac{\text{deaths from tuberculosis}}{\text{deaths from all causes}} (q_x)$

† P'_x = probability of surviving to the beginning of the stated period assuming no mortality from causes other than tuberculosis

All rates shown in per cent

Table 5—Cumulative Fatality Rates from Tuberculosis at Specified Times Following Registration, 1952 and 1951

Diagnosis at Registration		6 months	12 months	18 months	24 months
Minimal					
	1952	0.0	0.0	0.0	0.0
	1951	3.9	7.9	7.9	10.0
Moderately Advanced					
	1952	6.2	7.2	7.2	7.2
	1951	14.8	25.0	27.2	28.4
Far Advanced					
	1952	16.9	19.9	23.9	24.9
	1951	40.5	49.4	51.9	54.5
All Other					
	1952	5.5	6.4	7.3	7.3
	1951	6.4	6.4	6.4	6.4
Total					
	1952	8.2	9.7	11.1	11.4
	1951	16.5	22.1	23.3	24.6

24.9 per cent if they were registered in 1952 and 54.5 per cent if diagnosed the previous year, a decrease in fatality rate of 54 per cent in 1952. Mortality among those with minimal pulmonary involvement was less marked because of their better prognosis, but it was noteworthy that there were no deaths in the 1952 group, whereas the rate of 10 per cent for the 1951 group represented five deaths in the two-year period of observation. Only one-third of the cases of minimal pulmonary tuberculosis registered in 1952 were put on the home chemotherapy program and it is interesting that this comparatively minor participation may have been sufficient to account for the observed difference.

Marked differences between the two groups were also evident when deaths prior to hospitalization only were considered. Among those waiting for sanatorium admission, 7 per cent of the 1952 group and 20 per cent of the 1951 group died within six months and before hospitalization could be arranged.

It was observed that more patients who were registered in 1952 when home chemotherapy could be obtained refused hospital beds when they were offered than did the 1951 registrants. The differences in refusals were not significant but may represent a trend with continuation of home chemotherapy. While some patients who refused hospitalization were under the misapprehension that they were virtually "cured," others responded so well that their decision was not a harmful one.

Discussion and Summary

In an attempt to alleviate the grave tuberculosis problem in Baltimore where mortality was high and institutional facilities meager, the Baltimore City Health Department in 1952 initiated a program of home treatment with antimicrobial drugs. This program was designed primarily to extend prompt specific treatment to the tuberculous who were waiting for hospital admission. Chemotherapy, in the form of one gram of streptomycin twice weekly and 12 grams of sodium para-aminosalicylic acid daily, was offered all persons who were regarded as suitable for such therapy but who could not themselves purchase it.

Under consideration in this study were all cases of active tuberculosis among Negroes reported to the City Health Department for the first time during the last seven months of 1952. All such cases registered during the same months in 1951, when there was no home chemotherapy program, constituted a comparable group. Ninety-six per cent of the 356 cases registered in 1952, of whom almost one-half were given chemotherapy at home, and the 330 cases reported in 1951 were followed for at least 24 months. The duration of home treatment of the 172 patients on the program varied from less than one month to more than 24 months. The principal reason for termination of therapy was (for two-thirds of the patients) admission to hospital, after an average of four months of treatment. Mortality was chosen as the unequivocal index of comparison to determine the effectiveness of the program, and the two-year mortality experience of the groups was compared.

Within two years after registration, 40 of the newly reported Negro patients with active tuberculosis in 1952 had died of the disease, whereas 80 of the patients reported in 1951 succumbed to tuberculosis. The two-year cumulative fatality rate from tuberculosis was 11.4 per cent for the 1952 group and 24.6 per cent for the 1951 group, representing a 54 per cent decrease in the group which had chemotherapy at home. These differences were more marked when only advanced cases of pulmonary tuberculosis were considered.

A point worth emphasizing is that the greatly improved outlook for survival of the treated group, which was so evident during the first year of observation, was maintained for the two-year period of the study.

A most significant reflection of the effects of this program was seen in the tuberculosis mortality rate of the city as a whole. During 1952, the year of the inception of this program, the tuberculosis mortality rate among Baltimore Negroes was 100.5 per 100,000 residents, whereas in the following year, 1953, it had fallen to 52.1, a decrease of 48 per cent. A decline of this magnitude in a single year was unknown in Baltimore where the greatest annual decrease previously observed was 18 per cent. In 1954, there was a further decline of 20 per cent, resulting in a death rate of 41.5 per 100,000 population.

The home chemotherapy program has been in continuous operation since it was begun in 1952, has been modified in some respects, and has included increasing numbers of patients. More recently, with improvement in hospital facilities, the need for home treatment has shifted to a larger proportion of postsanatorium patients. It appears likely that even the provision of adequate institutional bed space will not do away with the need for home chemotherapy and such programs may, perhaps on a small scale, become a desirable part of the tuberculosis control program.

ACKNOWLEDGMENT—Statistical assistance for this study was provided by Matthew L. Taback, Sc.D., director, Statistical Section, Baltimore City Health Department and members of his staff. The author wishes to acknowledge her indebtedness to the late W. Thurber Fales, Sc.D., for his part in initiating this study. She also wishes to express her gratitude to H. Margaret Lea and Alice M. Sundberg for their invaluable assistance in the administration of the program and to Philip E. Sartwell, M.D., for his kindness in reviewing the manuscript.

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Practical Application of Ultraviolet Radiation in Purification of Naturally Contaminated Water

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The apparatus used in this study offers a reliable means of purifying private water supplies known to be subject to contamination. It is suited also for country schools, summer camps, vacationists, boatmen, and hunters. It is not suggested as a means of replacing community water purification systems, except perhaps in emergencies.

Studies on the effectiveness of ultraviolet radiation as a means of water purification have been general and qualitative rather than quantitative. For this reason public health authorities have not been in a position to recommend the method for water purification. The work reported here is believed to be the first systematic and quantitative approach to study factors which, if properly controlled, make ultraviolet radiation a valuable tool for limited-scale purification of water. A small unit known as the A.R.F. U-V Water Purifier was used in these studies.

The factors associated with the use of ultraviolet radiation in water purification can be broadly grouped into two categories: (1) those affecting available intensity, and (2) those affecting the use of the available intensity.

Factors Affecting Available Intensity —There must be adequate intensity of the germicidal lamp established and maintained in the unit. Figure 1 shows that intensities above 650 mw/ft^2 (measured at a distance of 2¾ in. in air) are effective against large populations of the index organism for fecal contamination Escherichia coli. When studies are made as to whether or not U-V irradiation is lethal to E. coli in natural waters, most probable number (MPN) determinations alone are of significance with respect to the survival of this bacterium. In these tests 164 samples yielded an MPN of zero when the initial contamination level was in the order of one to 12 million organisms per 100 ml. When highly contaminated samples were irradiated with intensities below 630 mw/ft,^{2} 19 out of 37 yielded an MPN of zero. Hence, for the unit under study 650 mw/ft^2 is a minimum reliable intensity for extremely high contaminations.

The available intensity depends on several factors. Figure 2 shows the effect of age of lamp on the available intensity. It can be seen that the available intensity at the end of 12 months based on 14 burning hours a day is still above the minimum safe intensity

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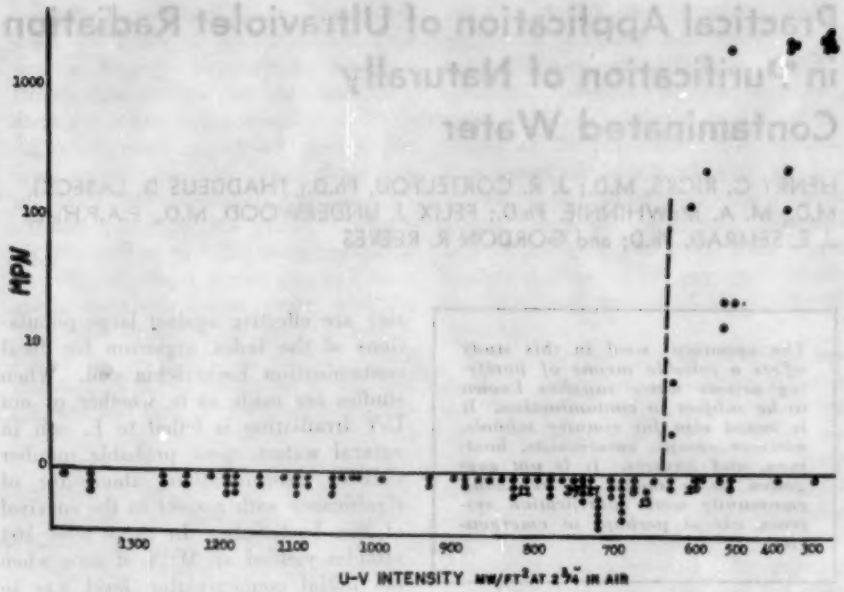

Figure 1

of 650 mw/ft.[2] The lower curve has been reported by the lamp manufacturer on the basis of numerous lamps tested; the upper curve represents our experienced intensity values for lamps exposed to a life test. This curve is higher than that of the lamp manufacturers because of an improved circuit within the purifying apparatus. Moreover, the manufacturer of the purifier selects the lamps by a 100-hour screening process, thus affording a greater margin of safety.

Another factor affecting available intensity is power line voltage. Figure 3 demonstrates that if line voltage falls as low as 100 v there is still 78.3 per cent of the original ultraviolet intensity available which is also above the minimum safe value of 650 mw/ft.[2] established for this purifier.

As with a decrease of power line voltage so with a decrease of the temperature of the water there is a depreciation of the ultraviolet radiation available. Figure 4 shows that even if the water temperature falls to 5° C. there is still 87 per cent of the original ultraviolet intensity available. Such control of temperature effects is achieved by a quartz enclosure around the lamp which isolates the lamp from direct contact with the water.

Still another factor affecting the available intensity is the transmission of ultraviolet radiation through the water being purified. The mineral and organic content of the water effect this transmission. Figure 5 shows that even with the most unfavorable water reported by Luckiesh, Taylor, and Kerr[3] the available intensity, because of absorption, would decrease only to three-fourths of that encountered with the waters that were used in establishing the minimum required intensity.

Use of Available Intensity—The preceding factors are those that affect the

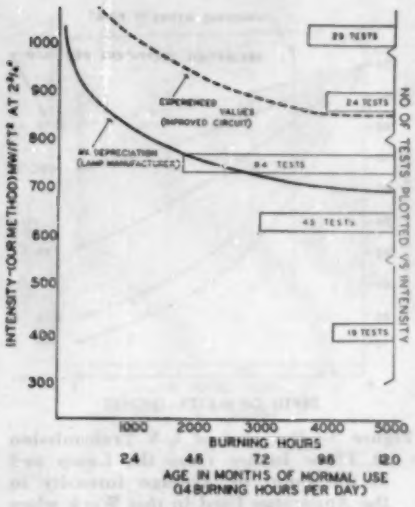

Figure 2

available intensity. The second group of basic investigations deals with the factors that affect the use of the available intensity. One of these is the difference of resistance of bacterial species to ultraviolet irradiation. One of the least resistant species is Salmonella typhosa, whereas E. coli, the index organism for fecal contamination of water, shows greater resistance than all water-borne enteric pathogens. Hence, if E. coli is destroyed, all common water-borne enteric pathogenic bacteria should also be destroyed. As stated above, E. coli was used in establishing the minimum intensity requirements for the purifier. Tests were also made with water artificially contaminated with S. typhosa. Contamination levels varied from 7,000 to 20,900/ml. The intensity of the U-V lamp varied from 780 to 1,200 mw/ft.^{2} There were no survivors in any samples collected at each of the flow rates (16, 32, 48, and 64 oz/min). In the studies with S. typhosa total counts were made on bismuth-sulfite media.

Another factor affecting the use of available intensity is adequate duration of exposure of all particles of water to the germicidal energy. Both the pattern of flow and the rate of flow affect the duration of exposure. The apparatus used in these studies provides for control of the flow pattern by use of baffles and the control of the rate of flow by a hydraulic valve which does not permit the flow to exceed 1½ qts/min. This flow rate was established on the basis of numerous studies which are presented in Figure 6. The data show that an MPN of zero will be achieved at flow rates up to 2 qts/min. The hydraulic valve in the purifier has been designed to allow a maximum flow rate of 1½ qts/min.

One further factor affecting the use of the available intensity is, naturally, the human element. This factor can be eliminated by the observance of the following elementary precautions: (1) the lamp obviously must be on; (2) two minutes should be allowed for warm up of the lamp; (3) the lamp enclosure should be kept reasonably clean (this is facilitated by having a

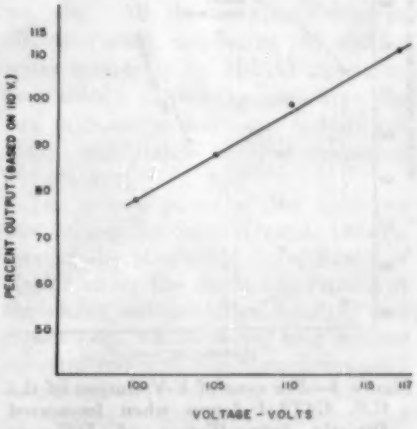

Figure 3—Per cent of U-V Output of the G.E. G4T4/I Lamp when Line Voltage Is Varied Above and Below 110v

transparent clip-on jar); (4) the lamp preferably should be changed every six months; and (5) the drinking water should be reasonably clear and free of debris.

It may be argued that all of the factors mentioned may be present and at their worst at the same time, although it is not considered statistically probable. On the other hand, in the laboratory tests population densities were excessively high as compared to those found in natural drinking waters.

Field Studies of Purifier Efficiency—In addition to the laboratory studies, extensive field studies were made consisting of 450 water examinations, the source of water being privately owned wells known to be notoriously contaminated. Examination of the samples for the coliform group was done according to Public Health Service Drinking Water Standards, using the technic described in the ninth edition of "Standard Methods for the Examination of Water and Sewage." The presumptive test was performed by placing 5 ml, 1 ml, and 0.1 ml of the water sample in three groups of five fermentation tubes, each containing 20 ml of one and one-half strength lactose broth. The tubes were incubated for 24 hours at 35° C. If no gas was present at that time, the test was called negative. If gas was present, the confirmatory test was made.

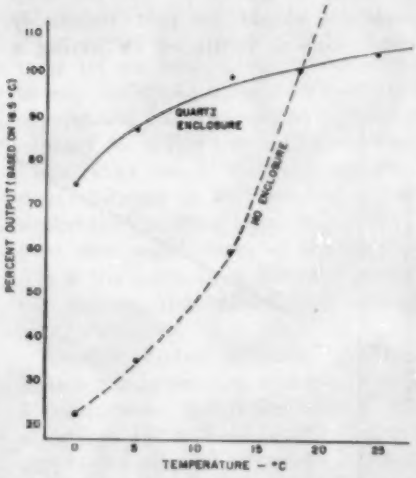

Figure 4—Per cent of U-V Output of the G.E. G4T4/I Lamp when Immersed Directly into Waters of Different Temperatures and when Provided with a Quartz Enclosure at the Same Temperatures

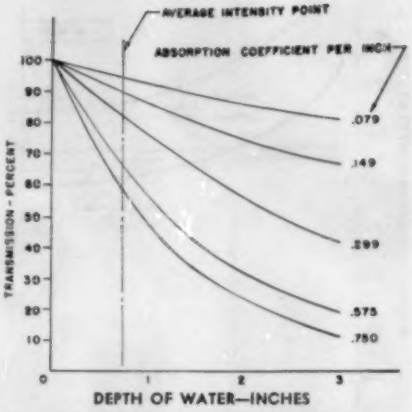

Figure 5—Per cent of U-V Transmission at Three Inches from the Lamp and at the Point of Average Intensity in the Apparatus Used in this Work when Waters of Different Absorption Coefficients Are Used

Media for the confirmatory test was 2 per cent brilliant green (bile) broth. With a standard loop, approximately 0.05 ml was transferred from each presumptively positive lactose tube to five tubes of brilliant green broth. The tubes were read after incubating for 24 hours. If gas was present at the end of that time, the test was called positive; if none was present, the tubes were reincubated to a total of 48 hours and any tubes not showing gas at this time were called negative. The MPN was arrived at by counting the number

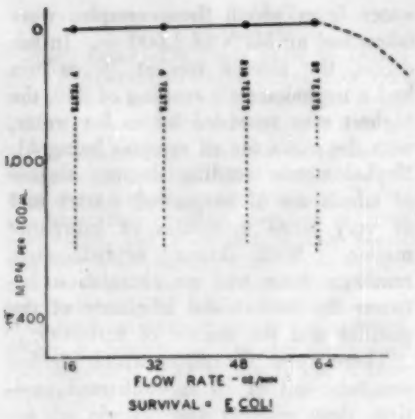

Figure 6

of positive tubes confirmed in 5 ml, 1 ml, and 0.1 ml. The table of Standard Methods was consulted for MPN/100 ml. MPN can also be determined for other quantities by consulting the appropriate table.

This field study was divided into two phases. The purifier used for the "pilot" stage of the field study differs slightly from that which was used during the second phase, the latter having an improved circuit which produces a considerably greater ultraviolet output from the same lamp. The water for this "pilot" study was collected from 85 different, but heavily contaminated private wells and brought immediately to the Pike County Health Department in McComb, Miss. There a pump was constructed, imitating the commonly used rural pump. None of the water samples came from a source containing chlorine. The water sample to be passed through the purifier was collected immediately after the lamp was turned on and again at the end of 60 seconds (not after 120 seconds as emphasized by the lamp and purifier manufacturers). Eighty-five water samples so tested yielded 170 separate experiments.

Out of 170 water samples examined, eight were found to be unacceptable according to USPHS standards. Four of these eight samples were obviously entirely unsuitable for any method of purification as they were little better than a thick suspension of mud, sand, and organic debris. The next two samples, of these eight, exemplified and taught us the necessity for warm-up period prior to the use of the purifier. These samples were run at the rate of 1½ qts/min (subsequently considered as top safe rate of flow for this purifier). Two portions of these samples were collected for analysis immediately after the lamp was turned on and yielded two positive tubes out of 10. Two other portions of the same samples were collected after only one minute warm-up period and yielded an MPN of zero. The last two of the eight samples exemplified and taught us that with the ultraviolet output then used the rates of flow exceeding 1½ qts/min may occasionally fail to render water absolutely potable; portions collected for analysis at the end of a one-minute warm-up period yielded one and two positive tubes, respectively, with the flow rate of 1¾ qts/min. All the remaining tests in this pilot study, numbering 162, yielded water acceptable by USPHS standards, even though all these samples were also run without a warm-up period and many with rates of flow exceeding 1½ qts/min.

The second phase of the field test was done at the State Hygienic Laboratory of the Mississippi State Board of Health under the direct supervision of the senior author. Two hundred and eighty tests, all numbered and entered consecutively into the State Laboratory formal records, represent 130 samples of heavily (naturally) contaminated water, many containing heavy suspensions of organic matter, mud, and even small representatives of the animal

kingdom. The samples were collected at various rates of flow ranging from 1½ qts/min to well over 3 qts. Most of these 130 samples were subjected to multiple tests.

For the first 80 samples no warm-up period was observed, thus mimicking the failure of adherence to this necessary instruction on the part of the potentially careless user. In this group of 80 tests there were 14 samples which had one tube confirmed out of 15 ("confirmed-acceptable"). In the remaining 50 samples the warm-up period was observed, and only one sample out of 50 showed one confirmed tube of 15 tubes (making it acceptable according to USPHS standards). Most of the samples were, in addition, tested by the "batch method"—that is, irradiating the static, nonflowing water for three minutes as would be done in one's car on a hunting, fishing or camping trip, or in the case of emergency. One sample in the "batch method" exemplified and taught that the jar should be filled only to the level indicated in the instructions since with the jar filled to the top, there was one confirmed tube out of 15. Although this is acceptable according to USPHS standards, it reveals the necessity of this instruction concerning level of fill.

Only three tests during the entire study showed results unsatisfactory according to USPHS standards. One sample had an MPN of 1,600 + before purification and 4.5 after (two tubes positive out of 15); no warm-up period of the lamp was allowed. It is of interest that water from the same source run two weeks later also at a rate of 1½ qts/min and also without a warm-up period was rendered entirely potable. The other two positive samples resulted from allowing the water to flow through the purifier at a rate of 118 oz, which is over 3½ qts/min, and 75 oz—almost 2½ qts/min—respectively. The raw water from which these samples were taken had an MPN of 1,600 +. In addition, the sample run at 75 oz/min had a nephelometric reading of 830, the highest ever recorded by us for water, with the mean for all samples being 41. Nephelometric reading denotes degree of admixture of suspended matter and of very large molecules of inorganic matter. With lower nephelometric readings there was no correlation between the bactericidal efficiency of the purifier and the degree of turbidity.

There were 16 samples which yielded one tube out of 15 as confirmed positive, thus meeting the criteria of acceptability according to USPHS standards. Only one of those was run at a rate of 1½ qts/min, but for that particular sample there was no warm-up period. The rest of these "acceptable" samples were run with rates of flow of 2 qts/min and faster.

There were 70 samples with an MPN of zero which had been passed through the purifier at flow rates of 2 qts/min and faster. These results are chiefly attributable to an increased U-V output produced by an improved electrical circuit. We would recommend, however, continuation of 1½ qts/min rate of flow, thus assuring that even heavily contaminated water under adverse conditions will be rendered potable. This is based on the evidence that each test out of 450 performed in the field studies showed purified water to be potable if the rate of flow was not in excess of 1½ qts/min and a two-minute warm-up period was observed.

The data presented here offer in a systematic way the limits of those factors which have been repeatedly stated to render ultraviolet irradiation impractical. It can be seen that those factors, although real, can be reliably compensated for by proper design, thus opening a new and useful agent for purification of individual water supplies.

Summary of Field Tests

"PILOT" STUDY—170 TESTS FROM 85 DIFFERENT CONTAMINATED WATER SAMPLES AT PIKE COUNTY HEALTH DEPARTMENT, McCOMB, MISS.

One hundred and sixty-two tests showed results acceptable by USPHS standards. Eight tests showed results unacceptable by USPHS standards; four of these contained so much mud, sand, and suspended organic matter that they were considered unsuitable for any method of purification. Of the four remaining "unacceptable," two confirmed tubes out of 10 when no warm-up period was observed. (When 60 seconds warm up was observed all tests negative). Two tests were run at rates of flow over top "safe speed" and produced one and two confirmed positive tubes.

All remaining experiments yielded results proving purified water to be potable in accordance with USPHS standards; the available intensity of ultraviolet radiation in equipment used in this study was less than in the second phase of field testing when the improved (now standard) electrical circuit was introduced.

Second Phase of Field Testing

280 TESTS FROM 130 CONTAMINATED WATER SAMPLES, STATE LABORATORY, MISSISSIPPI STATE BOARD OF HEALTH, JACKSON, MISS.

Two hundred and seventy-seven tests showed results acceptable by USPHS standards. Three tests showed results unacceptable by USPHS standards. Of the unacceptable, the first was at a rate of flow 48 oz (1½ qts)/min. No warm-up period. MPN in unpurified sample: 1,600+. MPN in "purified" sample: 4.5. Same source (same MPN) two weeks later yielded potable purified sample, although no warm-up period was observed.

Another was at a rate of flow 118 oz/min (over 3½ qts—more than twice the maximum standard rate of flow in the purifier). MPN in unpurified sample: 1,600+. MPN in "purified" sample: 6.8.

In the third the rate of flow 75 oz/min. Four consecutive runs. MPN in unpurified sample: 1,600+. MPN in "purified" samples: 180, 170, 170, 140.

Note: nephelometric reading of this sample (degree of "turbidity") 830 (average for all samples: 41).

All remaining experiments yielded results proving purified water to be potable in accordance with USPHS standards.

Summary of Conclusions

Purification of contaminated water on individual consumer basis should not replace sound public health measures established to provide the public with safe water. Also, it should not be considered as a replacement for efforts to improve individual sources of water.

The purifier studied and discussed, known as A.R.F. U-V Water Purifier, compensates for factors known to decrease bactericidal effect of ultraviolet radiation. The purifier constitutes an effective and safe means of purification of even heavily contaminated water providing (1) two-minute warm-up period is observed prior to use of the purifier; (2) water to be purified is reasonably clear by visual inspection (very muddy water, full of visible debris decreases the efficiency of the apparatus); and (3) the lamp is changed, preferably every six months (based on 14 hours burning time daily).

The purifier with the aid of an available adaptor and standard automobile electrical system, is useful in cases of (1) emergency (power and/or municipal water supply failure); (2) hunting, fishing, camping trips; or (3) travel to areas (particularly outside the United States) where drinking water is unsafe.

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Epidemiology of Human Brucellosis in Iowa

STANLEY L. HENDRICKS, D.V.M., M.P.H., F.A.P.H.A.

An increasing proportion of cases of brucellosis now comes from close contact with infected cows and pigs and fewer are caused by the consumption of unpasteurized dairy products. What Iowa is doing about this serious public health problem is recounted here.

Of the diseases of animals transmissible to man, the one that is reported most frequently in man in Iowa is brucellosis. Iowa's first human case was recognized in 1926.[1] From then until the end of 1953, 8,642 human cases and 71 deaths due to brucellosis have been reported to the Iowa State Department of Health. A large number of these cases have been exhaustively investigated. The reports[1-4] of these studies have been published and will not be reviewed here. Highly significant among the many facts described were reports of the importance of the skin as a portal of entry for Brucella organisms,[2] the milk-borne epidemics of human brucellosis due to B. suis emphasizing the danger of allowing hogs to mingle with dairy cows,[3] and the occurrence of B. melitensis in man and hogs in Iowa.[4]

While it is recognized that not all brucellosis cases are reported, 2,047 were recorded during the 1951–1953 period. Of these, 1,201 came from practicing physicians and 846 were based on reports from the State Hygienic Laboratory of an agglutination titer of 1:160 or higher.* A case registry of patients by name is maintained to avoid duplications. The following discussion deals with the 1,201 cases. Geographically they were scattered throughout the state with the counties having the larger packing houses reporting the higher incidences.

Occupation and Sex—The occupation and sex of 720 cases reported during 1952 and 1953 on which this information is available are shown in Table 1. Fifty per cent of the cases were male farm workers and 22 per cent were packing house employees. The number

Table 1—Human Brucellosis in Iowa 1952–1953, Distribution of Cases by Occupation and Sex

Occupation	Male	Female	Total
Male farm workers	363		363
Packing house employees	142	16	158
Housewives		74	74
Miscellaneous occupations *	29	3	32
Students	15	9	24
Veterinarians	20		20
Livestock dealers	12		12
Rendering plant employees	8		8
Truckers	8		8
Merchants	6		6
Retail butchers	5	1	6
No data	6	3	9
Total	614(85%)	106(15%)	720

* Includes a teacher, bar tender, mason, café operator, beautician, auto salesman, auto mechanic, plumber, Armed Forces personnel, junk dealer, and a turkey processing plant field man.

* The antigen used is standardized with the U. S. Department of Agriculture, Agricultural Research Service antigen.

of housewives reported with brucellosis during this period may seem unusually large. However, 76 per cent of the 74 were rural housewives. Not infrequently farm women help their husbands with the farm work and in the care of livestock. They thereby are exposed to the same reservoirs of infection in much the same manner as male farm workers. For example, a rural housewife developed a B. suis bacteremia after caring for baby pigs.

Of the cases reported during the 1952–1953 period, 85 per cent were male and 15 per cent were female, as compared with 79 per cent and 21 per cent, respectively, reported by Jordan [5] for a series of Iowa cases from 1940–1946.

Age—The percentages of the Iowa 1951–1953 cases in each 10-year age group and over 50 are 1.6, 5.7, 26.7, 34.5, 20.0, and 11.5, respectively. This age distribution differs somewhat when compared with other reports. For the Iowa 1951–1953 group there is a lower percentage of cases in the first and second decades of life and over 50 and a higher percentage among persons in the third and fourth decades of life as compared with a Wisconsin [6] 1948–1951 group and an Iowa [5] 1940–1946 series.

Seasonal Distribution—Feig,[6] Hart, et al.,[7] and Magoffin, et al.,[8] observed no marked variation in the seasonal incidence of human brucellosis in Wisconsin, Connecticut, and Minnesota. Jordan and Borts [9] reported more patients with initial symptoms during June (10.9 per cent), July (11.2 per cent), and August (10.8 per cent) than in other months in a series of Iowa cases from 1933 to 1946. Of the Iowa 1951–1953 cases, information on the month of onset is available for 989 and is shown graphically by occupation in Figure 1. The seasonal variation is most marked among male farm workers with about two and one-half times as many cases with beginning symptoms in June as in January. For all occupational groups the seasonal distribution of onset varied from 5.5 per cent having initial symptoms in February to 13.8 per cent in June.

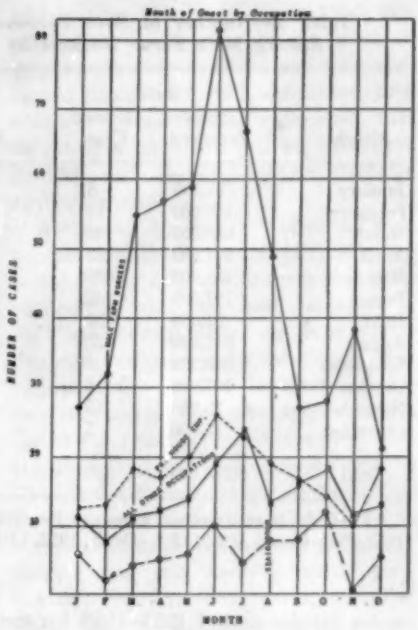

Figure 1—Human Brucellosis in Iowa—1951–1953, Month of Onset by Occupation

Since a large majority of male farm workers in Iowa have contact with animals it is interesting to compare the month of onset of brucellosis in this occupational group with the number of pigs born each month. Table 2 lists the numbers of sows farrowed by month and the number of brucellosis cases among male farm workers by month of

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Dr. Hendricks is public health veterinarian, Iowa State Department of Health, Des Moines, Iowa.

This paper was presented before the Conference of Public Health Veterinarians at the Eighty-Second Annual Meeting of the American Public Health Association in Buffalo, N. Y., October 11, 1954.

Table 2—Number of Sows Farrowed by Month * and Brucellosis Cases Among Male Farm Workers by Month of Onset Iowa 1951–1953

Month	1951 Sows Farrowed	1951 Human Cases	1952 Sows Farrowed	1952 Human Cases	1953 Sows Farrowed	1953 Human Cases
January	31,000	8	25,000	10	35,000	9
February	159,000	12	144,000	12	170,000	8
March	630,000	22	513,000	15	509,000	18
April	921,000	22	779,000	17	688,000	18
May	453,000	28	428,000	15	366,000	16
June	197,000	42	230,000	20	196,000	21
July	81,000	32	103,000	15	100,000	20
August	217,000	22	206,000	13	241,000	14
September	343,000	8	299,000	12	255,000	7
October	147,000	13	118,000	9	96,000	6
November	25,000	15	24,000	12	23,000	11
December	15,000	5	14,000	9	19,000	7
Total	3,219,000	229	2,883,000	159	2,702,000	155

* From the Iowa Crop and Livestock Reporting Service. Crop & Livestock News 11:1 (Dec.), 1951, 12:1 (June), 1952, 12:1 (Dec.), 1952, 13:1 (June), 1953, 14:1 (June), 1954.

onset for the period 1951–1953 for the cases for which this information is available. These data are presented graphically in Figure 2 and clearly show the seasonal nature of farrowings. The spring high point is reached in April and the much lower fall peak occurs in September. The seasonal nature of the onset of brucellosis among male farm workers follows a similar pattern. The spring peak of human cases among this occupational group is reached in June and the lower fall peak occurs in November. In both spring and fall the high points in human cases occur two months after the peak farrowing seasons.

Thus it would seem that persons

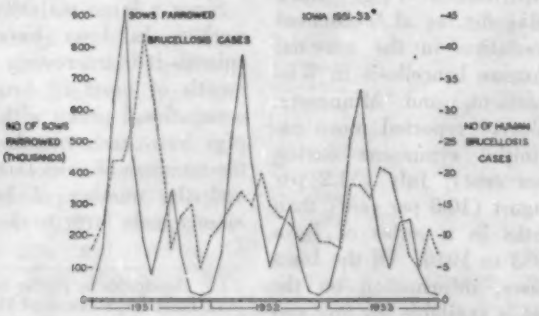

Figure 2—Number of Sows Farrowed by Month and Reported Brucellosis Cases Among Male Farm Workers by Month of Onset

* Data from Table 2

caring for livestock are more likely to become infected with brucellosis during farrowing season than at any other time of the year. Knowing that persons caring for sows during parturition frequently do have contact with newborn pigs, uterine fluids, and fetal membranes it is not difficult to understand that this might occur. The fact that the seasonal variation of the human cases is not as extreme as the farrowings perhaps can be explained at least in part. Some of the male farm workers no doubt become infected from other sources, such as contact with infected cattle, drinking raw milk from infected cows, or contact with infected hogs at other times. Also, the insidious nature of the onset of human brucellosis and its variable incubation period would tend to prevent sharp seasonal variations.

Animal Contact—Of the 1951–1953 group of patients, 80 per cent were engaged in occupations that resulted in animal contact or worked at other occupations, but reported having had contact with animals or animal excretions in the weeks before onset of illness. This may be compared with 75 per cent for the Iowa cases for the period 1940–1946.[5] The stated occupation of a person may be misleading at times in locating the possible source of infection. For example, in 1953, two machinists working in a plant in which no aminals were involved and who consumed pasteurized milk developed brucellosis. Investigation revealed that they had a part-time job on Saturdays loading and hauling manure from a rendering plant.

At times, apparently, rather indirect contact results in human Brucella infection. For example, on two occasions carpenters who had been engaged in building construction on hog farms during previous weeks developed brucellosis. In another instance an 11-year-old urban boy who spent quite a lot of time playing around a hog buying station at the edge of town became ill with the disease. Since epidemiologic investigations indicated that the more common sources, such as direct animal contact and raw dairy products were not involved in these cases, it seems likely that the infections resulted from contaminated environment.

Species of Brucella—Sixty-one per cent of the Brucella cultures isolated from human patients in Iowa during the period 1927–1953 were B. suis. This is in contrast to Minnesota,[8] Wisconsin,[6] and Connecticut,[7] where 85.8 per cent, 96 per cent, and 93.2 per cent, respectively, were B. abortus (see Table 3). This fact, no doubt, is related to

Table 3—Distribution of Species of Brucella Isolated from Human Patients in Iowa, Minnesota, Wisconsin, and Connecticut

	Total Number of Isolations	Per cent Brucella abortus	Per cent Brucella suis	Per cent Brucella melitensis	Source of Data
Iowa					
1927–1953	539	26.0	61.0	13.0	
Minnesota					Ref.
1945–1948	268	85.8	6.0	8.2	8
Wisconsin					Ref.
1946–1948	238	96.0	3.0	1.0	6
Connecticut					Ref.
1934–1952	176	93.2	6.2	0.6	7

the difference in seasonal incidence as discussed previously when Iowa is compared with these states. With a higher percentage of cases being due to B. suis they would be more likely to occur during the season in which persons have the most contact with contaminated animals, uterine fluids, and fetal membranes.

Reservoir of Infection—Data presented above would indicate that hogs constitute a major reservoir of Brucella infection in Iowa. However, information pertaining to the exact incidence of the disease in hogs in the state is not available. In 1935 McNutt [10] reported that 2.3 per cent of the 1,547 hogs tested reacted positively to the agglutination test in a dilution of 1:50 or higher. The Iowa Veterinary Medical Diagnostic Laboratory tested 9,545 and 13,570 hog blood specimens in 1951 and 1952, respectively.[11] Of these 4.1 per cent reacted positively to the Brucella agglutination test in a dilution of 1:100 or higher in 1951 and 3.6 per cent of the 1952 group were positive. Since the specimens tested were not a random sample, the results may or may not indicate the incidence of infection among Iowa hogs. Specimens are submitted to the laboratory for one or more of several reasons. Some hogs undoubtedly were tested more than once. Regardless of the exact incidence of the disease among swine, the hog crop of approximately 20 million animals per year in Iowa provides a large potential reservoir of infection.

There is also a reservoir of the disease among cattle in the state. During 1951, 5.9 per cent of 89,412 bovine blood specimens reacted positively to the agglutination test. In 1952, 3.8 per cent of 129,538 samples were positive.[11] As with the swine specimens the bovine specimens were selected and do not constitute a random sample.

An example will illustrate the public health seriousness of the reservoir of bovine brucellosis. While the mortality rate among human brucellosis cases is low, deaths do occur. In January of this year the death of a four-year-old girl due to brucellosis was reported to the State Department of Health. Diagnosis had been confirmed by isolation of B. abortus from the patient. Investigation revealed that the girl had lived on a dairy and hog farm with her parents and one sister. The family drank raw milk from their dairy herd. One cow had aborted in November, 1953. Blood specimens for brucellosis agglutination tests were drawn from the cattle on February 10, 1954, and on this day one more cow aborted. Eight of 20 cows tested * reacted positively to the blood agglutination test in a dilution of 1:100 or higher and were classified as reactors. One cow reacted positively in a dilution of 1:50 and was classed as a suspect. On February 17 a milk sample was taken from each quarter of the udder of each positive reacting cow and from the suspect. B. abortus was isolated from the milk from three of the reactor cows by direct culture of gravity cream and from the milk from six of the eight reactor cows by guinea pig inoculation and culture by the director of the State Hygienic Laboratory. One cow was shedding the organism from three quarters. Other members of the family were not ill and were negative to the agglutination test in January. While many farm families in recent years have purchased home pasteurizing units it would appear that the percentage of rural families using pasteurized milk still is low. This study revealed that 70 per cent of the patients who drank milk from their own cows prior to illness did so without the benefits of pasteurization.

Blood testing of animals for brucel-

* Tests done at the Iowa Veterinary Medical Diagnostic Laboratory.

losis on farms from which human cases of the disease have been reported has been carried on in Iowa for a number of years through the cooperation of the practicing veterinarians with the U. S. Department of Agriculture Animal Disease Eradication Branch (formerly BAI), the Iowa State Department of Agriculture, and the Iowa State Department of Health. Of 3,332 cattle tested in 260 herds under this arrangement, 16 per cent reacted. Sixty-one per cent of the herds tested contained reactors. Of 833 hogs tested in 78 herds, 19 per cent reacted. Thirty-five per cent of the swine herds tested contained reactors.

Prevention—It is recognized that prevention of human brucellosis is dependent upon eradication of the disease in animals.[9] In Iowa progress is being made in this direction. For example, under the cooperative program of the federal and State Departments of Agriculture 19,190 cattle were tested for brucellosis in June, 1954, as compared with 9,829 in June of the previous year.[13] This is more significant than the number alone would indicate. The agencies named above along with the Iowa State College Extension Service have established a milk ring (ABR) testing program that has been carried out on a county-wide basis in many counties. It is used as a screening test and herds that are positive on the ring test are then blood tested. The result is that the blood testing is being concentrated on those herds in which Brucella infected animals are most likely to be found. There has been a marked increase in calfhood vaccination against brucellosis. In June, 1954, 19,297 calves were officially vaccinated as compared with 8,544 in June of the preceding year.[13]

It is generally agreed that the herd sire is the most important factor in the spread of swine brucellosis.[12] Control of the sire then should lower the incidence of the disease among hogs. With this in mind a swine brucellosis control program was initiated in 1949 by the state veterinarian in cooperation with the U. S. Bureau of Animal Industry and the Iowa State College Veterinary Medical Research Institute.[12] The immediate objective of the plan is to develop brucellosis-free breeding herds from which the commercial hog raiser can obtain disease-free breeding stock. The Iowa Certified Brucellosis Controlled Swine Herd Program lists three plans for ridding infected herds of the disease, of which the hog breeder may select the one best suited to his herd operation. It provides for a method of certifying herds free from brucellosis and gives official recognition to herds that are free of the disease. In 1950 only eight herds were certified. The program has progressed so that for the first eight months of this year 78 herds were on the certified list.

Summary

Human brucellosis continues to occur throughout Iowa each year. The reported cases in man for the period 1951–1953 covered by this summary differ from earlier findings. For the later group the percentage incidence was higher in males; the seasonal variation in onset was greater; a higher percentage of cases had contact with animals; and a higher proportion occurred in the 20- to 39-year-age group. Thus, it would appear that an increasingly larger proportion of the cases result from animal contact and a smaller number from consuming contaminated unpasteurized dairy products. There is indication that male farm workers in Iowa are more likely to become infected during the sow farrowing season than at other times of the year. A reservoir of brucellosis exists in both cattle and hogs in the state and programs to eliminate it are under way.

Although the pasteurization of dairy products plays an important role in human infection, contact with infected animals is the major source in Iowa. Only by complete eradication of the disease in animals will human brucellosis be prevented.

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A New Medical Abstract

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Some Toxicologic Aspects of Atmospheric Pollution

NORTON NELSON, Ph.D.

This is a topic about which most of us will want to keep ourselves informed just because it is an area of growing importance in public health. As collateral benefits, the reader may gain a deep respect for the difficulties involved in any investigation of the effects of air pollution upon the health of people.

A report on such a broad subject could not be adequately covered in the space allotted. Necessarily, then, restriction to selected aspects will be required. One might properly substitute in the title the words "Health Aspects" for "Toxicologic Aspects" and, considered in this way, we find that definable facts of broad applicability bearing on health impairment from air pollution are comparatively few. Intensive efforts to study this problem, however, are going forward in several centers and there is every reason to believe that substantial improvement over the present elementary state of our knowledge is on its way.

It is quite possibly true that the economic losses and general nuisance from air pollution are of more consequence to society than impairment of health. It is certainly true that at the present time and in most instances the nuisances and economic losses provide a much more objective background on which to base a campaign for control of air pollution than do claims of health impairment. The latter, of course, provides the much more dramatic basis for seeking correction.

For our purposes the major effects of air pollution can be considered in three broad categories: (1) economic loss—an example would be deterioration of merchandise through soilage; (2) annoyance—odors and eye irritation short of eye damage would be representative; and (3) health impairment or disease. Effects on the respiratory system directly or indirectly appear to be the major health factor in air pollution. It is this aspect that will be considered here, and two facets only will be covered, respiratory irritants and lung cancer. This restriction eliminates effects on the skin, presumably a minor consideration, and eye irritation, a much more important problem.

A second restriction has to do with the exclusion of those episodes which arise from an industrial plant accident or some other unusual plant discharge which affects a local and restricted community. Examples of such situations are the Poza Rica accident[1] in which H_2S was the offending agent, the report of manganese poisoning in a Scandinavian community,[2] and the cases of berylliosis observed in the area

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around a beryllium plant.[3] These last cited episodes (excepting manganese in which pneumonia was reported) are exceptional in another sense also in that they present an instance of the induction of a definite and unique disease entity in response to a specific toxic agent. There is every reason to believe that this is most unusual.

Nonspecific Respiratory Effects of Irritants in General

Contaminants producing unique disease processes routinely found in urban centers and industrial areas exist in concentrations very much below those ordinarily considered capable of producing even a low grade toxicity. This is illustrated by Table 1 from Kehoe,[4] which lists air concentrations for a number of substances as found in several localities and contrasts these values with the levels considered permissible for occupational exposure without hazard of poisoning. Complete safety, in most instances, would still be expected even if due allowance is made for the fact that community exposure involves a 24-hour exposure every day in the week instead of only during working hours, and also takes into account reasonable factors of safety for the differences in the population exposed—that is, a complete cross-section in the one instance including the very young, the very old, and the ill, in contrast to presumably healthy workers on the other hand.

Nevertheless, as will be developed more fully, there is unquestionable evidence that air pollution can contribute to health impairment. This certainly must be taken to mean that the contrast we have shown above does not support all of the reassurance that it first presents and that the reservations noted may have a greater weight than we are now inclined to allow them. But equally important is the implication that we should give greater weight to the effect of nonspecific irritants. It seems most probable that the difficulties observed in Donora in 1948, in London in 1952, and possibly other places as well are definitely attributa-

Table 1—Comparison of Maximum Allowable Concentrations of Certain Substances in Industrial Atmospheres, with Concentrations Found in Certain Community Atmospheres
(Concentrations in parts per million by volume, as in mg per cu M.)

Substance	Maximum Allowable Concentration	Concentration in Community Atmospheres		
		Cincinnati		
		Rural and Residential	Commercial and Industrial	Donora
Carbon monoxide	100 ppm *	Nil to traces	50.0 ppm‡	Nil to traces
Chlorine	1 ppm †	0.04 ppm	0.055 ppm	0.04 ppm
Fluorine (as hydrofluoric acid)	3 ppm †	0.003 ppm	0.006 ppm	0.005–0.0075 ppm
Oxides of nitrogen	25 ppm *	0.10 ppm	0.10 ppm	0.18 –0.40 ppm
Sulphur dioxide	10 ppm †	0.15 ppm	0.12 ppm	0.32 –0.39 ppm
Cadmium	0.1 mg *	.....	.....	<0.001 mg
Lead	0.15 mg *	0.0015 mg	0.0035 mg	0.02 –0.032 mg
Manganese	60.00 mg *	0.004 mg	0.004 mg	.....
Zinc	15.00 mg †	0.001 mg	0.003 mg	0.015–0.77 mg

* ASA standard (4).
† Codes of certain states of United States.
‡ Actual observations range from traces up to 50 ppm, the latter being infrequent and of short duration.
(From reference 4).

ble to the fact that a nonspecific respiratory irritant or group of irritants impose an additional stress on an already overburdened respiratory or cardiac system. It may be anticipated that irritants acting together generally will yield at the least an additive effect. There is, moreover, at least some experimental evidence indicating that respiratory irritants may in fact produce alterations in pulmonary function at levels not only below those ordinarily considered safe but even below the level of sensory detection. This will be discussed more fully.

The extent of such borderline difficulties actually induced in any particular situation is exceedingly difficult to determine. The disorders arising from pulmonary irritants distinguish themselves in no way whatsoever from those observed in a host of other respiratory disorders occurring frequently in the general population. Inhalation of an irritant may produce a variety of physiological changes. Although these are ordinarily of minor consequence, in an individual with pre-existing respiratory or heart disease these disturbances may constitute a serious problem. The changes produced would initially be those of inflammation, that is, capillary engorgement followed by exudation of fluid. These changes would be evidenced by coughing, wheezing, and increased respiratory effort. The accumulation of fluid in the pulmonary spaces would lead to a reduction in effective respiratory volume and increase in thickness through which gas exchange must occur. Also possible is a decrease in ciliary activity with the possibility of enhanced irritant effect resulting from lowered rate of removal of the irritant. These pulmonary changes in turn alter pulmonary circulation and may thereby impose an additional burden on the heart. The fact that these changes are physiologically no different from those observed in many diseases makes their quantitative evaluation very difficult indeed. The Donora investigation [5] presents us with one of the most nearly quantitative analyses of respiratory difficulty from air contaminants that we have. Table 2 (from 5) illustrates some of the findings in a study of this episode. This chart illustrates a real and systematic increase in complaints or "affections" and shows their greater frequency where pre-existing disorders are present.

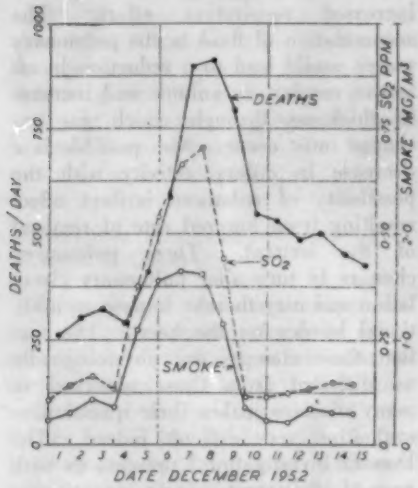
Table 2—Incidence of Smog Affection in Donora as Influenced by Pre-Existing Disorders

Group	Per cent with Smog Affections All Degrees	Severe
Average		
All persons	42.7	10.4
Pre-existing		
Bronchial Asthma	87.6	56.6
Heart Disease	77.2	36.5
Chronic Bronchitis	78.9	26.8

Adapted from reference 5.

The London episode in 1952 led to reports of increased hospital admissions and increased house and office calls, but no reliable quantitative information on these threshold disorders is available. The least ambiguous measure of effect is, of course, death. The London experience illustrates this very well. In the period from December 5 to 9, 1952, the weather in London was unseasonably cold and there was a persistent inversion. During this period it has been estimated that some 4,000 excess deaths occurred. The association of these increased death rates with sulfur dioxide concentration is illustrated in Figure 1.[6] The peak concentration of 1.34 parts per million is still an averaged value and it is possible that values

Figure 1—Daily Air Pollution and Deaths



(From: E. T. Wilkens—Air Pollution and the London Fog of December 1952. Fig. 4, p. 10, The Royal Sanitary Institute, London, 1953.)

substantially higher than this were sustained for one or two hours.

Whether the sulfur dioxide was the sole or even major factor cannot with certainty be established. It may well be that other irritants were equally or more important. The extensive use of coal, especially for domestic heating in London, as well as for power, leads to discharge of large quantities of sulfur dioxide to the atmosphere. Sulfur dioxide is at least a good index of pollution in London air and is, further, the component for which extensive data exist. These values are of course much below those considered acceptable for work places. A value of 10 ppm has been accepted as tolerable in most industrial hygiene circles.

It might incidentally be noted that while sulfur dioxide concentrations as high as those reported in London have not, to my knowledge, been reported in this country as a general air contaminant, concentrations approaching this value do occur; for example, a concentration of 0.86 ppm was found in New York City during a period of inversion in November of 1953.[7]

The vast range between level and effect of sulfur dioxide with varying species and varying times of exposure is illustrated in Table 3. Here it is seen that a very substantial spread, as one would expect, exists between effective levels with short exposures in comparison to longer exposures. Interestingly enough, habituation to sulfur dioxide appears to increase tolerance in so far as annoyance is concerned, but also leads to increased accuracy and sensitivity in identification. Most striking, however, are the last entries in the table which show reflex changes in respiration with levels of sulfur dioxide well below the level of detection. These latter observations are from the work of Amdur, et al.,[8] which presents a most important series of observations for this problem.

These workers have in a series of studies measured the heart rate, respiratory pattern and respiratory volumes

Table 3—Response to Sulfur Dioxide *

	SO_2 ppm	
LD_{50}, 30 minute, rat	1,800	
Lethal conc., 113 hours, guinea pig	112	
Lethal conc., 30 days at 6 hrs., mice and rabbits	50	
	U†	A‡
Man, irritating or objectionable	5–20	10–30
Man, identification	3–12	2–4
Man, detection	2–12	2–3
Man, modifies respiratory pattern	1–2	1–>10?

* Adapted from reference 25; rat LD_{50}, unpublished data, Institute of Industrial Medicine, New York University.

† U—Unaccustomed to SO_2.

‡ A—Accustomed to SO_2.

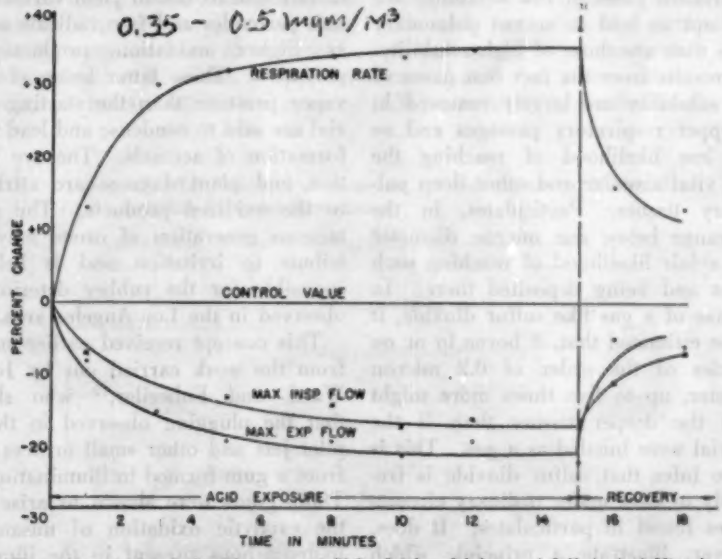
while exposing their subjects to a series of concentrations of SO_2 and H_2SO_4. The test material was introduced at levels below the threshold of detection and without the knowledge of the subject, so that the physiological changes observed appear to be entirely reflex in nature.

Figure 2 (from 9) illustrates typical findings with sulfuric acid mists which show changes in pulse rate, tidal volume and respiratory rate at levels of from 0.35 to 0.5 mg per liter, a level below the detection threshold for these subjects. These investigators have reported similar findings with sulfur dioxide with concentrations also below the sensory threshold.[8] It is of interest that subjects habitually working in atmospheres of sulfur dioxide did not show such reflex changes.

The extent of the physiological stress involved in these changes is of course not necessarily defined by these observations. They are, however, among the first definite and objective physiologic changes observed at levels of the irritants approaching the range of concern as common air pollutants. It may well be that these effects would be enhanced and would be significant in individuals with impaired respiratory or cardiac function.

This work emphasizes a point of view of the greatest importance in considering the toxicity of air pollutants; that is, the necessity of giving consideration to functional changes as contrasted with organic changes. The functional operation of an organ may be distorted or modified by a toxin without leaving any evidence of trauma if the insult is survived. This suggests the usefulness of searching for such functional changes in the human being and indicates a deficiency in the conventional toxico-

Figure 2—Effect of Sulfuric Acid Mist on Respiration Rate and Maximum Inspiratory and Expiratory Flow Rates



(From: Mary Amdur, Leslie Silverman, and Philip Drinker—Inhalation of Sulfuric Acid Mists by Human Subjects. Arch. Ind. Hyg. & Occup. Med. 6:307, Fig. 1, 1952.)

logical approach based on death or morphological changes in tissues.

A point worth particular comment arising in part from the findings of Amdur, as noted above, and also from other studies contrasting the toxicity of sulfuric acid and sulfur dioxide is that sulfur in the form of sulfuric acid appears to be as much as five times as effective or toxic as the same amount of sulfur in the form of sulfur dioxide. This might arise from the fact that sulfuric acid is a stronger acid. However, another factor may be equally or even more important. Thus, sulfuric acid exists in the form of particles as a result of its low vapor pressure, while sulfur dioxide exists in the form of a gas. There is evidence to suggest that the depth of penetration in the lungs of water-soluble gases may be increased when they exist in the form of very small particles rather than as a gas. If this is the case, those irritants borne by small particles may reach a more susceptible locus of deposition.

Thus, it has been generally observed that irritant gases of low solubility are more apt to lead to severe pulmonary effects than are those of high solubility. This results from the fact that gases of high solubility are largely removed in the upper respiratory passages and so have less likelihood of reaching the more vital alveolar and other deep pulmonary tissues. Particulates, in the size range below one micron diameter have a fair likelihood of reaching such tissues and being deposited there. In the case of a gas like sulfur dioxide, it can be estimated that, if borne in or on particles of the order of 0.2 micron diameter, up to five times more might reach the deeper tissues than if the material were inhaled as a gas. This is not to infer that sulfur dioxide is frequently or ever under ordinary circumstances found in particulates. It does, however, illustrate a principle which may be of considerable importance. Work by LaBelle [10] appears to provide experimental substantiation of this principle.

While discussing the general problems of pulmonary irritants, it will be useful to call attention briefly to a concept developed out of the Los Angeles studies. The Los Angeles smog situation has led to the elaboration of a hypothesis by Haagen-Smit and others [11] which undertakes to show a mechanism by which all of the major phenomena of smog observed in Los Angeles can be produced. These phenomena are: loss of visibility due to the presence of aerosols in the atmosphere; eye irritation; plant damage; objectionable odors; and rubber deterioration. All of these are stated to arise from hydrocarbon vapor as a result of a series of photochemically mediated oxidative processes. In essence, the concept states that the hydrocarbons, primarily the 4, 5, and 6 carbon aliphatics, especially the olefins and branched chain hydrocarbons, are oxidized in the air through the photochemical mediation of nitrogen oxides to yield various irritant peroxides and free radicals as well as higher oxidation products and polymers. These latter being of lower vapor pressure than the starting material are said to condense and lead to the formation of aerosols. The eye irritation and plant damage are attributed to the oxidized products. The simultaneous generation of ozone may contribute to irritation and is held responsible for the rubber deterioration observed in the Los Angeles area.

This concept received earlier support from the work carried out by Jordan, Ward, and Fulweiler,[12] who showed that the plugging observed in the gas pilot jets and other small orifices arose from a gum formed in illuminating gas. These gums were shown to arise from the catalytic oxidation of unsaturated hydrocarbons present in the illuminating gas. The oxidation was mediated

by nitrogen oxides and led to the formation of aerosols of a gummy nature. This earlier work has actually led to a standard testing procedure for gum protective equipment which involves the use of butadiene with oxygen and nitrogen oxide added to the test gas.

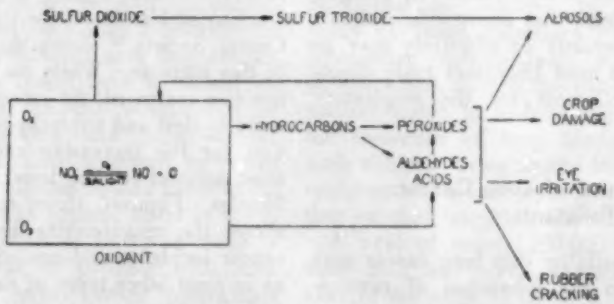
The scheme proposed by Haagen-Smit involves essentially the same process but occurs at much lower concentrations and appears to be photochemically activated. This development arose out of apparent inability to explain the observed effects in the Los Angeles area on the basis of the concentrations of other pollutants found in the atmosphere. Moreover, they were apparently detecting more ozone than could be explained from known sources.

A series of studies have been carried out (see 11 for references) which appear to show that these effects can be duplicated from synthetic smogs developed from gasoline or other hydrocarbons in the presence of nitrogen oxides and sunlight. Ozone is also generated under such circumstances. Neither the reactions involved nor their end products can be taken to be demonstrated in detail at this time. It appears, however, to be an intricately interrelated series of catalyzed reactions in which the nitrogen oxides may be pivotal; ozone is produced, participates in the oxidation, and tends to accumulate. These processes then jointly lead to the oxidation of hydrocarbons, yielding a number of products. Some of these interrelationships are illustrated in Figure 3.[11]

If this development of pollutants from hydrocarbon vapors is shown to be of significance in Los Angeles, it may well be of importance in other urban centers where large amounts of hydrocarbons are also discharged into the air from the use, storage, and transportation of gasoline and other hydrocarbons.

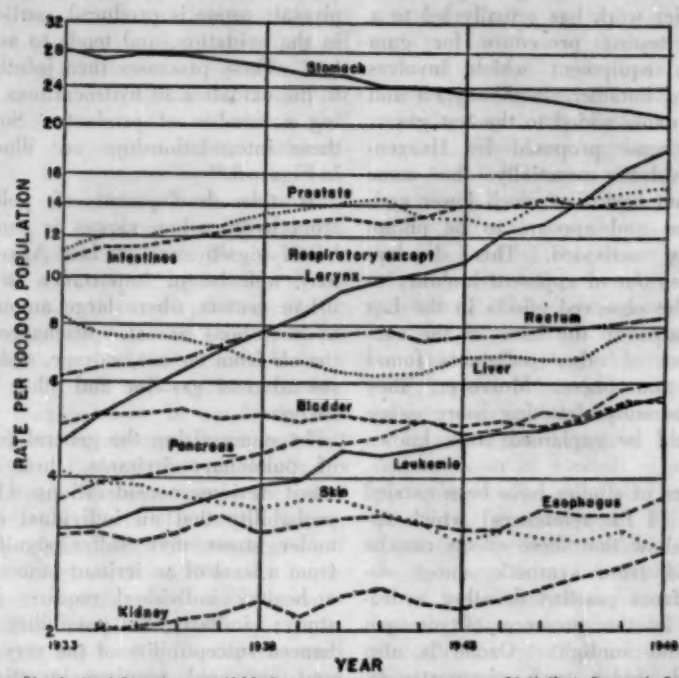
In summarizing the general problem of pulmonary irritants, three points merit serious consideration: (1) the probability that an individual already under stress may suffer significantly from a level of an irritant innocuous to a healthy individual requires further study; similarly, the possibility of enhanced susceptibility of the very young and very old requires investigation; (2) such factors as the physical state of pollutants, e.g., particulate versus gas, should be given close scrutiny; (3) more study is needed of the possi-

Figure 3—Schematic Presentation of Reactions in Polluted Air Leading to Smog Symptoms



(From: A. J. Haagen-Smit—Chemistry and Physiology of Los Angeles Smog. Ind. Eng. Chem. 44:1346, Fig. 3, 1952.)

Figure 4—White Male Cancer Death Rates by Site, United States, 1933–1948



a Standardized for age on the 1940 Census population. Statistical Research Section
SOURCE: National Office of Vital Statistics; Bureau of the Census. IO-53 American Cancer Society

(From: E. Cuyler Hammond—Smoking in Relation to Lung Cancer: A Follow-Up Study. Connecticut State Med. J. 18:4, Fig. 1, 1954.)

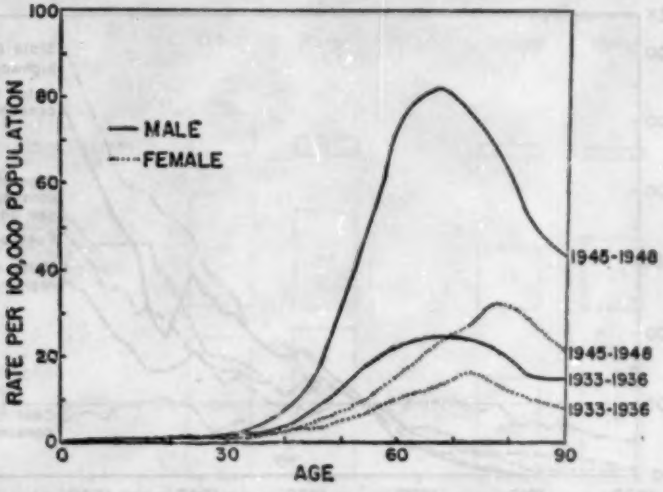
bility that pulmonary irritants other than those conventionally accepted as important in the past may be making a significant contribution. In general, it would seem that nonspecific irritants acting separately or additively may be one of the most important toxic effects of air pollutants for the respiratory system.

The Induction of Lung Cancer from Air Pollutants

The possibility that lung cancer may arise from the inhalation of carcinogenic materials has, of course, been suggested for many years. The problem has within recent years received increasing attention; this arises quite naturally from the admitted very real increase in lung cancer incidence in recent decades. Figure 4, prepared by Dr. Cuyler Hammond for the American Cancer Society,[13] shows the magnitude of this increase. While the female rate has also increased, the increase is much more modest and any proposed explanation for the increasing rate in males must account for the lesser increase in females. Figure 5 (from reference 13) shows the relationships between lung cancer incidence and age, showing here as in most other types of cancer a general increase in rate with increasing age.

Many environmental factors have

Figure 5—Lung and Bronchus Cancer Death Rates, by Age and Sex—White Population of the United States, 1933–1936 and 1945–1948



SOURCE NATIONAL OFFICE OF VITAL STATISTICS; BUREAU OF THE CENSUS

STATISTICAL RESEARCH SECTION AMERICAN CANCER SOCIETY, 8-53

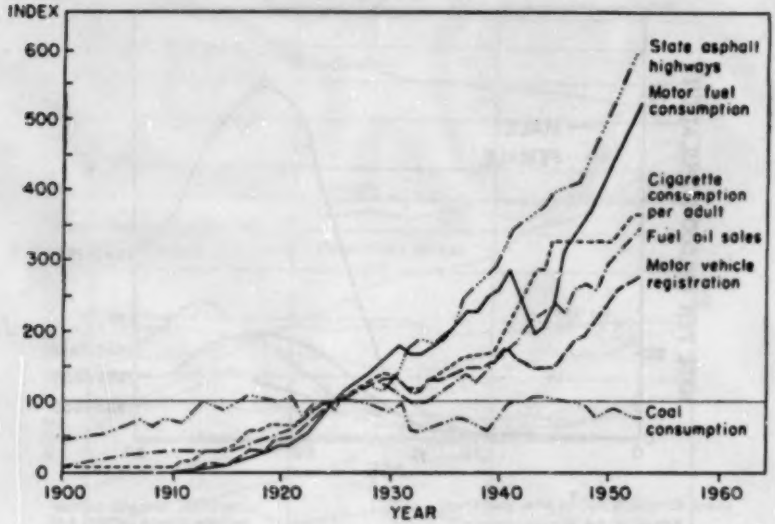
(From: E. Cuyler Hammond—Smoking in Relation to Lung Cancer: A Follow-Up Study. Connecticut State Med. J. 18:6, Fig. 3, 1954.)

been suggested as responsible for this increase. Many changes have occurred in the environment around us while the lung cancer rates have gone up. Figure 6 (from reference 14) illustrates some of these, including smoking, fuels, motor vehicles, asphalt roads. Smoking can hardly be regarded as an air pollutant; however, the evidence relating it to lung cancer needs brief examination since these findings may modify our consideration of any suggestion of association between air pollution and lung cancer. The last few years have witnessed intense interest in the relationship of cigarette smoking and lung cancer; many reports have appeared in recent years which emphasize this association. These reports in general agree in showing that smoking or heavy smoking is more frequent in patients with lung cancer than among other individuals corresponding in sex and age but without lung cancer.

Earlier studies have suffered from the possible bias that they are carried out on groups already selected, at least to the degree that they are hospital patients. Therefore, in the minds of many, such studies have been taken as strongly suggestive but by no means conclusive. The extensive investigation being carried out by the American Cancer Society under the direction of Dr. Hammond is intended to overcome many of these objections.[13] It is a prospective epidemiologic study—that is, one which collects the data as it develops—which is undertaking to learn the incidence of lung cancer among male subjects living at the start of the study against a background of information on their smoking habits.

A total of nearly 200,000 males in their fifth and sixth decades of life were in the study at its start. Comparatively few have been lost in the several years since. The records of smoking

Figure 6—Trends in Selected Environmental Factors in the United States, 1900–1953 (1924–1926 = 100)



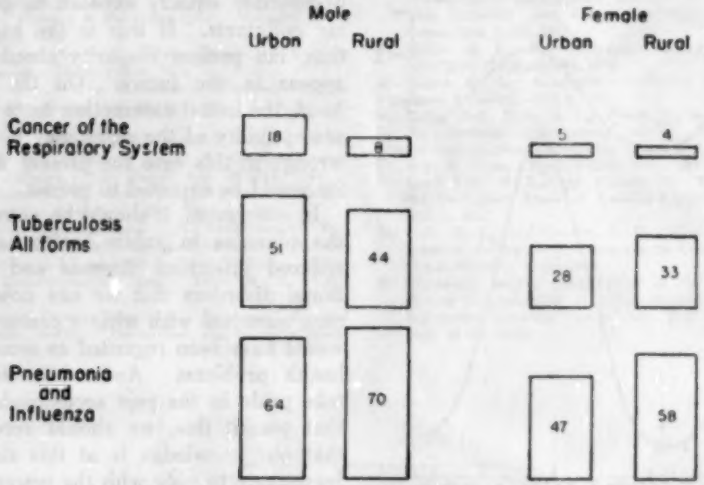
(From: E. Cuyler Hammond—Lung Cancer and Common Inhalants. Cancer 7:1105, Fig. 8, 1954.)

habits of the individuals are secured and maintained by a group of volunteers; the final cause of death, as each occurs, is established by death certificates and medical records. It was originally anticipated that conclusive results could not be expected in less than four or five years. Recently, however, an interim report was made [15] which states that the gross death rate and both total cancer rate and lung cancer rate were decisively increased in the smoking population. This provides, in so far as the study has thus far proceeded, confirmation of the retrospective epidemiologic studies and is definitely the most persuasive evidence now available of an association between lung cancer and smoking.

On the epidemiologic side, the data bearing on a relationship between general air pollutants and lung cancer is mixed and inadequate. In a number of special and limited situations a relationship to lung cancer has either been demonstrated or suggested. Thus, the possibility of association between chrome chemical manufacture and lung cancer appears very strong.[16] The same is true of the mining activity in Joachimstal and Schneeberg [17]; presumably in this case radioactivity is the carcinogenic agent. Other less clear-cut occupational connections have also been proposed. These, however, are all unique situations not likely to be of any importance for the general public.

There are data which show that lung cancer has a higher incidence in urban than in rural areas. This is shown in Figure 7.[14] Many other similar statistical findings have been reported both here and abroad (see reference 18 for fuller discussion). However, there is some doubt as to the reliability of this contrast since many factors other than air pollution differ and, in particular, reporting may be poorer in rural areas. It also appears that cigarette smoking is more frequent in urban than in rural

Figure 7—Death Rates of Selected Diseases of Respiratory System by Sex in Urban and Rural Population of the United States, 1944



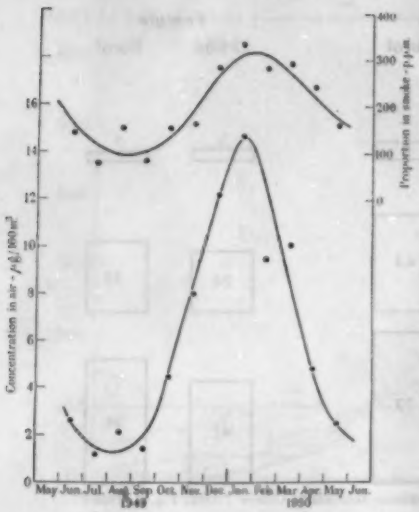
(From: E. Cuyler Hammond—Lung Cancer and Common Inhalants. Cancer 7:1101, Fig. 2, 1954.)

populations.[15] Presumably, therefore, data of this sort should be suitably corrected on the basis of the smoking hypothesis. I know of no data available which even attempt to accomplish this for air pollution, though such corrections have been applied tentatively to the study of cancer as related to occupation.[19] It appears that much better statistical information will be needed before any conclusion on the relation of air pollution to lung cancer can be drawn from this source.

Unquestionably, there are carcinogens in the air of cities. This was demonstrated many years ago by work carried out by the National Cancer Institute.[20] More recently, Waller,[21] Cooper,[22] and Kotin, et al.,[23a] have demonstrated carcinogenic polynuclear hydrocarbons in the air. All of these have identified the active carcinogen benzpyrene—Waller by fluorescence analysis, Cooper and Kotin by ultraviolet spectra. The latter also demonstrated this compound in automobile exhaust.[23b] The levels found by the English workers in the atmosphere were of the same order of magnitude but were distinctly higher than that found by Kotin's group in Los Angeles. Obviously, benzpyrene is not the only carcinogenic polynuclear compound in the tars collected from air. It is also completely uncertain what concentration would constitute an effective carcinogenic dose for man; it has been suggested that none of the levels found is in itself sufficiently high to be effective but that in association with other carcinogens, possibly cigarette smoke, effective levels would be attained. Another complicating factor is that these carcinogenic hydrocarbons are found in the air generally in association with, and possibly adsorbed on, carbon particles. Adsorption on carbon particles has been shown to reduce the biological activity of such hydrocarbons.[24] Whether this is a significant factor for the present consideration is also unknown.

Waller[21] has presented extensive data on the occurrence of benzpyrene in a number of locations in Britain

Figure 8—Yearly Cycle of Benzpyrene at London (County Hall)



(From: R. E. Waller—The Benzpyrene Content of Town Air. Brit. J. Cancer 6:13, Fig. 3, 1952.)

which, in general, show higher concentrations in the larger and more industrial centers. He also has secured information on the seasonal change in concentration shown in part in Figure 8,[21] which shows the highest levels occurring during the winter season.

From information presently available one can state that: (1) there is probably a higher incidence of lung cancer in urban than in rural groups; (2) urban and industrial centers have higher concentrations of known carcinogens than areas with less air pollution; and (3) no definite conclusion can be based on these possibly related factors at this time.

In so far as the sex differences in lung cancer are concerned, if one assumes that the sexes are equally susceptible, then smoking perhaps more readily fits available data than does air pollution on the basis that the frequency of smoking among women has only in recent years approached that among men, whereas women would be presumably equally exposed to general air pollutants. If this is the explanation, the present disparity should disappear in the future. On the other hand, the initial assumption as to equal susceptibility of the sexes may be quite wrong; in this case the present disparity would be expected to persist.

In conclusion, it should be noted that the advances in public health have so reduced infectious diseases and nutritional disorders that we can now concern ourselves with what a century ago would have been regarded as secondary health problems. And while we can take pride in the past accomplishments that permit this, we should recognize that our knowledge is at this time as inadequate to cope with the newer challenge as the knowledge of bacteriology was inadequate to cope with problems of infectious diseases a century ago.

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Postgraduate Course on the Lead Problem in Industry

An intensive postgraduate course on "Modern Considerations and Methods in Handling the Lead Problem in Industry" will be given by the Kettering Laboratory in the Department of Preventive Medicine and Industrial Health of the University of Cincinnati, November 7–11, 1955. The purpose is to present the most recent information concerning the prevention and control of the lead problem in modern industry. Physicians and industrial hygienists concerned with the lead problem should apply to the Secretary, Institute of Industrial Health, Kettering Laboratory, Eden and Bethesda Avenues, Cincinnati 19, for further information and application forms.

Epidemiologic Principles Applicable to the Study and Prevention of Child Accidents

ROSS A. McFARLAND, Ph.D.

Something of the complexity of the childhood accident prevention program is underscored here in this review of epidemiologic studies that have been undertaken. Suggested are some additional areas that might, and should, be subjected to the same sort of analysis.

It is now generally recognized that accidents constitute a major problem in public health. The loss of life and incapacity resulting from accidents is as great as, or greater than, that from any disease entity. Accidental injury is the leading cause of death for persons between one and 24 years of age, and is second for those between 25 and 44. Since these persons are in the younger age groups, an enormous cost to the productive resources of the country in terms of life-years is implied. Simply counting deaths is less meaningful than measurement of how many life-years have been lost prematurely.

In 1953, 15 per cent of all deaths resulting from accidents in the United States were among children under 15 years of age.[1] In the age group one to four, accidents kill twice as many as do measles, scarlet fever, whooping cough, diphtheria, dysentery, tuberculosis, and poliomyelitis combined.[30] The death rates for diseases in children have decreased markedly during the past twenty years, but accidental death rates have improved only slightly, if at all. The foregoing refers only to deaths. Injuries of varying degrees of severity result from accidents far more frequently than does death. Permanent disabilities in children have far-reaching consequences in individual adjustments and productivity which may exceed those following disabling accidents to older persons. Serious injuries are believed to outnumber deaths in children's accidents by as much as 100 to one [30] or even 150 to one.[1]

Epidemiologic Approach to the Study of Accidents

It is not generally appreciated that accidental injuries follow some of the same biological laws as do disease processes, and are also amenable to the epidemiologic approach. Accident distribution shows geographic variations, seasonal changes, and variations by age, by sex, and in respect to other parameters. Accidental injuries correspond in their behavior to the endemic pattern of infection that characterizes so many communicable diseases. They can be interpreted as resulting from the total forces involved in the competition between man and his environment.[17]

The causes of accidents are thus to be sought in the interactions among the host, the agent, and the environment. Such an analysis can provide the basis for highly specific programs of accident prevention since the epidemiologic concept of causation emphasizes the role of multiple causes in accidents, and constitutes a framework within which the findings of specialists from diverse fields can be integrated. The method

is also useful in revealing the relative importance and urgency of various aspects of the accident problem. For example, analyzing accidental deaths by age (host) and type (agent and environment) reveals that home accidents are crucial problems in the very young and the very old.[27] This approach can be used to analyze special problems of particular communities, specific kinds of accidents, or accidents of selected segments of the population.

Gordon[17] and Armstrong[3] were among the first in this country to propose the epidemiologic study of accidents, as did Cruikshank, in England.[9] Preventive measures resulting from these initial studies have now been developed for accidents in the home,[26, 27, 29] in industry,[22] among children,[4, 20] on the highway,[24] and in aviation.[25]

In applying epidemiologic principles to the study and prevention of children's accidents, the "population at risk" comprises a particular segment of the total population. Since most existing data lump together persons between 15 and 24 years of age, consideration will be mainly of those below 15 years.

To find the causes of children's accidents, it must first be known who had the accidents, when, where, and how they happened, as well as all the circumstances attending their occurrence. At present most of the information available refers to fatal accidents. Some data on nonfatal injuries have appeared, based on hospital and clinic records,[20] the experiences of insurance companies,[18, 30, 31] medical practitioners,[20, 28] and epidemiologic field studies.[18] Such data reveal that age is of importance, in that accidental injury and death rates are highest in the range 0–4 years, and decline somewhat through the 10–14 range. Also different kinds of accidents are more prevalent at certain ages than at others. The home is the environment where most accidents occur to children apart from those involving motor vehicles.

Accident Prevention Through Control of Host Factors

The basic question involved in attempting to reduce accidents in children through attention to characteristics of the host is, simply—what are the characteristics of children themselves which contribute to the accident?

One inference to be drawn from statistical analyses where age, sex, and activity have been related to types of agents and accidents, is that the level of development is a "host" characteristic of great importance. Understanding the role of host factors requires consideration of the behavior patterns which are characteristic at different ages. Wheatley has expressed this clearly in a discussion of the prevalence of poisoning accidents among children between one and three years of age. "The grasping functions and the drinking function are well developed. The child's most naturally developed method of learning about the physical properties of this world is to put the object or material in his mouth. This method of satisfying curiosity has full play during the run-about, exploring stage. This is the hand-to-mouth stage. This is the period of susceptibility to accidental poisoning."[32]

Temperamental factors and differences between the sexes also are variables which must be considered. In one series of fatal accidents among five- to 14-year-olds, more than a third were drownings, and nine-tenths of the vic-

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tims were boys. The drownings occurred during such activities as playing on thin ice, and on the banks of rivers, creeks, and canals. This may reflect more venturesome inclinations on the part of boys.[30] In contrast, girl's accidents have occurred chiefly indoors, involving falls, as on stairs, or touching hot objects.[26]

An implication of the foregoing is that the preventive measures adopted will show a shifting emphasis with age and sex. Initially, protecting children against accidents is the only possible procedure, but as the child acquires locomotion, rudimentary skills, and simple language, training and supervised experience become increasingly important. At later stages, protection becomes less possible, and perhaps less desirable. Education in safety then becomes the chief procedure for the control of host factors for the prevention of accidents.[4, 10]

The Question of the Unusually Susceptible Child

It has been proposed that some children are unusually susceptible to accidents, and that accidents can be reduced by identifying and treating such individuals. The psychiatric study of injured adults led to the concept that accidental injuries may resolve emotional tensions, particularly those resulting from unexpressed hostility and guilt,[6, 11] and this viewpoint has been extended to include the accidental injuries of children.

A few studies of children with repeated injuries have been made within this framework. Of 65 children with head injuries, about half had histories of two or more major injuries. The investigators concluded that the combination of a sadistic father and a passive, masochistic mother was significant, and that the children's accidents were aggressive reactions to frustration.[12] Tests were used in another study to compare accident-repeaters and accident-free boys in a junior high school. The accident-free were superior on tests of safety knowledge and of personal adjustment. The accident-repeaters were superior in gymnastic skill, and on strength tests, but gave more indication of emotion maladjustments. They also were observed to be more aggressive, to dominate social relationships by physical means, and to be poor losers and showoffs.[7]

A promising method for studying accident susceptibility in children has been developed at the University of Minnesota. Younger children were observed at play in a nursery school in an attempt to relate the frequency and kinds of injuries to their basic patterns of behavior. While children with the largest numbers of injuries showed few specific kinds of behavior in common, they all seemed to have difficulty adjusting to the group situation. The accident group was characterized by exceptional physical strength, dare-devil attitudes, emotional instability, impulsiveness and rudeness.[13, 14]

A pilot study of accident-repeater children at Columbia has raised questions concerning how prevalent "motivated" accidents may be, and whether conflicts about hostility and authority are as important in predisposing children to accidents as may be the case in adults. In this study, some accidents appeared to be a function of poor control when children overextended themselves in competing for status with other children, and some as a consequence of exposure to hazardous activities with which their older companions could cope safely. Only a limited number of accidents appeared to be serving the purpose of satisfying emotional needs, such as resolving tensions and gaining parental attention.[15, 21]

Further, well controlled studies are obviously needed. It is apparent that

the concept of the motivated accident, developed on a post-hoc basis for adults, may not be wholly applicable in the case of children, and cannot at present be used in the identification of individuals with undue susceptibility to accidents. Research has indicated that certain behavioral indexes may prove useful in identifying the accident repeater.[7, 21, 24] The individual treatment of children who have had repeated injuries may be effective in preventing subsequent accidents.

Role of Fatigue and Other Temporary Variables

There is little information available on the part played by a variety of transient "host" conditions in children's accidents. For instance, an analysis of the frequency of accidental injury by age and time of day suggests that fatigue may be a predisposing factor. Under age 15, the greatest frequency was toward the end of the day, at about 5 p.m.; beyond 15, the peak hour for accidents advanced regularly toward 10 or 11 p.m. in adults.[28] There is even less evidence on the importance of other temporary states. The studies on accident-repeater children, mentioned earlier, indicated that the likelihood of accidents increases when children are emotionally upset or under stress, as a function of the disruption of control. Additional studies are needed, not only in relation to fatigue and emotional disturbances, but to other temporary conditions as well. For instance, the role of diet and blood sugar levels, and the influence of commonly used medications in children's accidents have received little attention.

Consideration of the "Agent" in Children's Accidents

Preventing children's accidents through control of the "agent" requires a knowledge of the frequencies with which various agents produce accidental injury, and relating this information to circumstances of the host and environment. For example, among accidental poisonings of children aged one to five, kerosene was found to be the substance most frequently swallowed.[33] The "agents" involved in choking or strangulation accidents vary with age. Objects taken into the mouth are more important up to five; between five and 15, play with belts, ropes, etc., is the cause of choking or strangulation accidents.[2] Lead poisoning is frequently associated with play near houses with cracked and peeling paint.[32] From 40 to 60 per cent of the burn injuries seen in various clinics result from burning clothing.[31]

Preventing an interaction between the child and the agent is one method of preventing accidents. Securing the sides of cribs, locking medicine cabinets, storing poisonous silver polish on upper shelves, blocking off traffic on "play" streets are illustrations. As children become older, isolating them from hazardous agents is less possible. Training in the recognition and avoidance of hazardous situations becomes especially important, and safety education can be so disposed to result in safe practices without unduly restricting the natural proclivities and development of children.[10]

One approach is to prevent accidents by eliminating recognized hazards in the design stages of the equipment children are to use. Some examples of the results of advance analysis are lollipops with paper handles, blunt tipped scissors which cut only paper, unbreakable drinking cups, and bicycles with outrigger wheels. At the request of the American Academy of Pediatrics, the American Standards Association has established a committee to consider safety standards for: (a) the flammability of children's clothing; (b) the proper labeling of toxic paints and

coatings; (c) the design of harnesses and sleeping garments; and (d) the design and manufacture of furniture, carriages, and toys.[19]

While eliminating known hazards such as flammability in clothing, lead in paint, or top-heaviness in high chairs is important, the design of equipment should also be based on a knowledge of capabilities and limitations of the group who use the equipment.[22] Numerous instances may be cited where a difference in the size or design of children's furniture, toys, or clothing would have prevented accidents, or resulted in less severe injury. When human engineering data are incorporated in the original design of equipment, fewer accidents should result. Advance analysis of children's equipment can be carried out so that those features increasing the likelihood of accidents due to incompatability between the child and his equipment can be eliminated at the design-board stage.

Some of the necessary data for applying the principles of human engineering in the design of children's equipment are available, as, for instance, distributions of the heights and weights of children, and descriptions of growth and behavior at various ages.[16] Human sizing data can be obtained from anthropometric studies. Analyses of the activities of children can be carried out to furnish the designers of equipment with information on what children of different ages can and cannot do.

Control of the Environment to Prevent Children's Accidents

The information available on the role of the environment in the interactions producing children's accidents emphasizes the location of the accidents, and the frequency of particular agents or types of accidents in these settings, rather than such variables as temperature and humidity, the levels of illumination, or the physical properties of the surroundings.

Study of the home environment is particularly necessary to prevent children's accidents. Accidental death (excluding those from motor vehicle accidents) among children under five occurs chiefly in the home, and a substantial number occurs in the home throughout the first 15 years.[20] Falls are the leading cause of nonfatal injury up to age 14, most frequently as a result of tripping or slipping. Burns and scalds are second in importance in the early years, with cuts, lacerations, and abrasions becoming more frequent over five years of age.[5]

Table 1 illustrates how the environmental setting of accidents shifts with age. The data cover injuries requiring medical attention, or absence from school a half day or more.

When the environmental foci have been identified by such analyses, the role of particular features in the interaction between host, agent, and environment can be identified, and control measures devised. For example, of 1,000 serious burns in an English city, 70 per cent occurred in children, with girls outnumbering boys 3 to 1. In 53 per cent of these, the injury resulted from clothing being set afire by contact with unguarded heating appliances. Improved guards for heaters were a result of this analysis.[8] The much publicized "ice-box deaths" in this country provide another example. No reliable data are available on the frequency of these mishaps, the 29 deaths in 1953 were based upon newspaper accounts.[1] Environmental control, either through design for safety, e.g., doors that can be opened from inside, or enforced removal of doors from discarded refrigerators, is necessary to offset the appeal of these objects for children.

The part played by the environment in the causation of accidents must also be understood in terms of the physio-

Table 1—Injury Rates by Location and Grade Level *

	School Building	School Grounds	Going to or from School	Home	Other
All grades	4.0	4.7	0.8	3.3	3.8
Kindergarten through third grade	1.4	3.4	0.8	3.5	2.1
Fourth through sixth grades	2.4	5.4	1.0	3.6	3.9
Seventh through ninth grades	7.8	5.5	1.0	3.5	5.9
Senior high school	9.0	7.1	0.6	2.2	5.2

* Source: Accident Facts.[1]

logical and psychological effects on human performance, and in terms of the relationships between the capacities and limitations of children and the physical properties of their environment. For instance, some falls on stairways have been traced to the faulty design of carpeting. The pattern and coloring of the stair covering did not provide the contrast necessary for accurate perception of the position of the treads and risers, and the edges of the stairs could not be distinguished against their background. The concept of advance analysis for accident hazards which are known to result from environmental features should have an increasingly important place in accident prevention as more specific information is collected.

In addition to the physical environment, accidents are also influenced by social or sociological factors. For instance, the relative exposures to certain agents and certain physical features of the environment reflect the socioeconomic level of the family and the community. The ignorance, or knowledge, of parents regarding hazards and their behavior offered as models to the child also affect the possibilities of accidents.[5, 10] Parent-child relationships are important in the production of unusual susceptibility to accidents.[6, 11] Acceptance by other children in the group is important.[13, 14] Maintaining status among playmates can involve increased hazard.[15, 21]

Education and mental and emotional hygiene are preventive measures in this area. Physicians are in an especially advantageous position while treating parents or children to carry out indoctrination in safety. They can teach, not only specific preventive measures but also the principles of prevention based on knowledge of the host, interacting with factors of the agent and the environment.

Summary and Conclusions

The control of accidents falls within the province of preventive medicine and public health, because of the strictly medical aspects of accidental injuries and because of the important role played by human variables. Accidental injuries and deaths follow some of the same biological laws as do disease processes, and are amenable to epidemiologic methods of study and prevention. In most instances, there is multiple causation, and attempts at control should involve consideration of the agent, host, and environment. Although the host is of primary medical concern, the agent and the environment must also be considered in effective preventive measures. These principles apply

to the child population as well as to adults.

Attempts should be made first to set forth the basic physical, physiological, and psychological characteristics of children at various steps of development. When such facts are associated with the agent under given environmental conditions and at specific times and places, information can be obtained which should be helpful in understanding and preventing children's accidents. Factual information of this type can be discovered only by carefully controlled experimental studies, epidemiologic surveys, and statistical analysis. A dynamic and continuous safety program can produce positive results only by the constant application of the fundamental principles resulting from such studies. A successful program to prevent children's accidents requires the combined efforts of parents, the physician, the educator, the architect and engineer, and the public administrator.

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An Evaluation of a Questionnaire on Infant Development

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Can a screening device be perfected that will conserve the time of the physician who must make a developmental diagnosis of infants examined at a child health conference? Progress toward that desired end is reported here.

In the last half century, progress in controlling infectious diseases and in reducing morbidity and mortality has been so great that attention is now focused on deviations in behavioral development as one of the major problems facing those concerned with maintaining the health and well-being of children. A screening device for finding infants who have abnormalities that require a detailed developmental examination for diagnosis, treatment, and prognosis could be an extremely valuable tool in any integrated program of child care. This paper reports the first trial of a questionnaire that might serve as such a screening mechanism.

Method of Study

The opportunity to evaluate a questionnaire as a screening device offered itself when a decision was made to study the later development of premature infants, as part of a study of the 4,700 prematures born in Maryland in 1952. When the infants were 16, 28, and 40 weeks of age visits were made by public health nurses and information was obtained on their behavioral development from the mothers, using questionnaires based on the Gesell Developmental Schedules. In addition to the questionnaire at 40 weeks of age certain of the premature group born in Baltimore and an equal number of matched full-term controls were given a complete Gesell Developmental Examination [1] by a staff pediatrician experienced in this work (H.K.). This last fact permitted an evaluation of the 40-week questionnaire, since a comparison was possible between the infant's developmental status as indicated by the questionnaire completed by the nurse and the status as determined by the pediatrician's Gesell examination. There were 901 infants, 456

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premature, and 445 full-term, whose developmental status at 40 weeks was evaluated by both these methods.

As a check on the validity of the questionnaire itself, it was necessary to see if the same developmental status as that determined by the Gesell examination could be achieved by the questionnaire, when the best available information about the infant's behavior was used in answering the questionnaire. This was accomplished by studying the results when the observations recorded at the time of the examination itself were used by the pediatrician to fill out the questionnaire, independently of the one completed by the nurse in the interview with the mother.

The 40-week questionnaire, shown in Figure 1, covers behavior items which range from 28 to 52 weeks of age in gross motor, fine motor, adaptive, language, and personal-social behavior. Those items were chosen which the mother ordinarily observes in the course of the daily care of her child. Ambiguities in the phraseology were largely eliminated as the result of a preliminary trial made by several nurses.

It was not possible to provide an amount of inservice training that was considered completely adequate, but the following methods were used to prepare the nurses. A session about one hour in length in which the over-all Study of Prematures was described was held in several health districts and was attended by almost all the city nurses. A second hour was spent with the same groups during which films depicting behavior from four to 52 weeks were shown and infant development was discussed. An illustrated manual of instructions discussing the questionnaires in detail was sent to every nurse. Furthermore, the majority of the nurses had experience with the 16- and 28-week questionnaires prior to making the 40-week visit. Finally, the district nursing supervisors had an opportunity to observe a Gesell Developmental Examination. It should also be mentioned that the nurses were aware that their 40-week report would be followed by a developmental examination by the pediatrician, since one of their functions at the visit was to arrange for this examination which was part of the premature-full-term comparison.

It was planned that each infant would be visited by the nurse between seven and 10 days prior to his fortieth week. This could not always be accomplished, not only because of difficulties in scheduling the necessary number of appointments in the time available but also because not all of the mothers could keep the first appointment made for them. Age at the nurse's interview ranged from 32 to 49 weeks with a median of 38 weeks and with 85 per cent being seen between 37 and 39 weeks. Age at the physician's examination ranged from 34 to 69 weeks with a median of 40 weeks and with 75 per cent being seen between 39 and 41 weeks. In the case of the prematures the chronologic age was corrected to make allowance for the amount of prematurity.

In order to make the comparisons on which the evaluation of the screening questionnaire is based, each of the 901 infants was given three separate ratings. The first was made on the basis of the pediatrician's developmental examination, the second on the basis of the 40-week questionnaire completed by the nurse in the interview with the mother, and the third on the basis of the 40-week questionnaire completed by the physician using the findings of the developmental examination as the source of information. Explicit rules, which are described elsewhere,[2] were set up in order to give a rating to the physician's examination and to the two questionnaires completed on each baby. A rating of normal (N) was assigned when the infant was considered normal and without

Figure 1—Study of Prematures, the Johns Hopkins University School of Hygiene and Public Health, Maternal and Child Health Division

Developmental Schedule—Third Maturity Evaluation

Child's Name: _____ Study Number: _____

Check either "Yes" or "No" in each pair of spaces provided. Do not leave any pair blank. Write "Unknown" if unable to decide between "Yes" and "No."

	Yes	No
1. Does the baby sit on the floor or other hard surface without support		
(a) indefinitely without falling	—	—
(b) for at least 10 minutes without falling	—	—
(c) for about 1 minute without falling	—	—
2. Does the baby sit on the floor or other hard surface for a brief period by means of leaning forward and supporting himself on his hands	—	—
3. Does the baby		
(a) creep on his hands and knees	—	—
(b) pull himself along on his stomach	—	—
(c) move about in a circle in one spot (pivot)	—	—
4. Does the baby, when sitting,		
(a) pick up small things like crumbs or string with his thumb and index finger..	—	—
(b) try to pick up small things like crumbs or string with his thumb and index finger, but without success	—	—
(c) try to pick up small things by raking at them with all his fingers	—	—
5. Does the baby poke at things or into holes with his index finger..	—	—
6. Does the baby		
(a) take things out of a box or container	—	—
(b) put things into a box or container	—	—

	Yes	No
7. Does the baby, if more than one plaything is available,		
(a) pick up and hold a plaything in each hand and bang them together	—	—
(b) pick up a plaything in each hand but drop one to play with only one at a time	—	—
(c) pick up only a single plaything at a time.....	—	—
8. Does the baby say		
(a) "mama" or "dada" meaning his parents	—	—
(b) "ma-ma" or "da-da" without meaning his parents..	—	—
(c) "mumumumum" when he cries	—	—
9. Does the baby have any other "words" for things or people...	—	—
10. Does the baby recognize his name	—	—
11. Does the baby imitate any sounds made to him (such as a cough)..	—	—
12. Does the baby, when you ask him to, do a nursery trick (such as waving "bye-bye" or playing "pat-a-cake")		
(a) without your demonstrating it each time	—	—
(b) needing demonstration before doing it	—	—
13. Does the baby hold his own bottle for his feeding	—	—

Date of Visit: _____ Nurse's Signature: _____

signs of neurologic or intellectual damage. A rating of intermediate (I) was given when the infant showed some departure from normal behavior but appeared to require no particular follow-up. A rating of abnormal (A) indicated apparent signs of neurologic or intellectual damage with sufficient deviation from expected 40-week behavior to warrant careful observation to determine the prognosis for future development and the need for special treatment. It is important to realize that a rating of abnormal did not necessarily mean a poor prognosis for the child's future development. It picked out infants with deviations of a sufficient magnitude to require close developmental supervision.

Findings

In order to determine the extent to which the screening process properly referred infants for developmental evaluation, it is necessary to compare the findings from the questionnaire completed by the nurse in her interview with the mother with the findings of the Gesell Developmental Examination. Because this screening technic was not expected to make fine distinctions, cases are considered over- or underscreened only if there was a disagreement of two levels between the rating of the physician and nurse. These disagreements of two levels are called screening errors. Those abnormal infants whom the pediatrician felt needed close developmental supervision but whom the nurse's questionnaire failed to detect are the underscreened cases; they may be considered the false-negatives. Those infants who were progressing satisfactorily according to the pediatrician's examination but who, according to the nurse's report, showed a definite deviation from normal behavior are the overscreened cases; they may be regarded as the false-positives. Since those infants who required careful follow-up to determine the need for special treatment would be neglected if missed by the questionnaire, the underscreened cases are the more important group from the clinical point of view.

Table 1 compares the ratings from the nurse's reports with those of the pediatrician's examination. It is necessary to examine the body of the table to see the exact extent of agreement and of over- and underscreening. There is agreement in 597 cases (519+47+31), or in about two-thirds of the 901 total.

Table 1—Rating from Nurse's Report Compared to Rating from Physician's Examination

Rating from Nurse's Report		Rating from Physician's Examination						Total for Nurse's Report (4)	
		N (1)		I (2)		A (3)			
		No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
N (normal)		519	74.6	69	50.7	20	29.0	608	67.5
I (intermediate)		145	20.8	47	34.6	15	21.7	207	23.0
A (abnormal)		28	4.0	17	12.5	31	44.9	76	8.4
Unknown		4	0.6	3	2.2	3	4.3	10	1.1
Total for Physician's Examination	No.	696	100.0	136	100.0	69	99.9	901	100.0
	%	77.2		15.1		7.7		100.0	

Table 2—Underscreening by Nurse's Report According to Type of Abnormality

Physician's Examination Type of Abnormality	No. of Cases	Nurse's Questionnaire Underscreened Cases No.	 Per cent
All abnormal cases	69*	20	29.0
Intellectual defect	19	2	10.5
Serious neurologic abnormality	15	—	0
Possible cerebral palsy	34	14	41.2
Retardation in motor development but normal neurologic potential	8	4	50.0

* The number of cases rated Abnormal by the Gesell examination was 69 (Table 1), but 7 of these had overlapping diagnoses as follows: 5 had an intellectual defect and a serious neurologic abnormality, 2 had an intellectual defect and possible cerebral palsy. None of these 7 cases are underscreened.

Of the 69 cases called Abnormal (column 3) on the basis of the physician's examination, 20 are missed and are rated Normal by the nurse's report, an underscreening of 29 per cent. Of the 696 cases rated Normal on examination (column 1) 28 are called Abnormal by the questionnaire, an overscreening of 4.0 per cent.

At first glance, these results are far from encouraging. The question may be raised whether a screening device which fails to detect more than a quarter of the abnormal cases is a useful tool. Before coming to any conclusions, however, a study of possible causes is necessary. The amount of underscreening is the more significant error from the point of view of providing good supervision for children, while the amount of overscreening and hence overreferral could be important in the practical operation of a program where the time of a consultant in infant development would be limited.

The question of whether or not there are any circumstances associated with the use of the questionnaire which yield a particularly high percentage of screening errors will be examined first, under the headings of clinical factors, factors in the child and the mother, and factors in the nurse.* For example, were more screening errors made when the babies were prematurely born than when they were full-term deliveries; was there a change in the proportion over- and underscreened as the nurses became more experienced?

Since some clinical conditions are more severe and thus easier to detect, it was thought desirable to see if there was an association between the percentage of underscreening and the type of abnormality as diagnosed by the Gesell Developmental Examination. Table 2 shows the relationships found. While two of the cases with intellectual defect are underscreened on the basis of the nurse's report, it is important to call attention to the fact that none of the cases with serious neurologic abnormality are missed. On the basis of the questionnaire, 41 per cent of the cases in the "possible cerebral palsy" group are underscreened. These cases include infants who had signs and symptoms which would warrant a diagnosis of cerebral palsy had they been observed in an older child. However, clinical experience indicates that al-

* In judging the evidence on these and subsequent questions, the 5 per cent level of statistical significance is used.

Table 3—Screening Errors Between Ratings of Nurse and Physician by Estimate of Quality of History

	Rating Assigned						
	Overscreened Cases		Underscreened Cases				
Quality of History	Physician Normal	Nurse Abnormal	Physician Abnormal	Nurse Normal	Physician Total	Nurse Total	Per cent Misscreened
Satisfactory	625	23	52	14	677	37	5.5
Unsatisfactory	18	2	12	4	30	6	20.0
Undecided	36	2	5	2	41	4	9.8
Unknown	17	1	0	0	17	1	5.9
Total	696	28	69	20	765	48	6.3

$X^2 = 6.66$
$P < 0.01$
on 1 d. f.

though most infants with this degree of abnormality at 40 weeks of age eventually would compensate completely and have no neurological residua, cerebral palsy could not be ruled out definitively. An equally high percentage of underscreening is found in the infants diagnosed as having ultimate normal neurologic potential with retardation in motor development, but the total number of cases in this group was only eight.

For factors in the child and the mother the following were examined: race and sex, birthweight, age at nurse's interview, age at physician's examination, time interval between interview and examination, type of medical care received, education of the mother, and quality of the history given by the mother, as this was estimated by a member of the study staff at the time of the physician's examination. No association was found between these factors and screening errors except in the instance of the quality of the mother's history. Table 3 shows that a significantly lower percentage of cases are misscreened when the mother's history was considered to be satisfactory than when it was unsatisfactory or the observer was undecided about its quality. ($X^2 = 6.66$; $P < 0.01$ on 1 d. f.) There is no evidence of a significant difference when overscreening and underscreening are considered separately.

For factors in the nurse the following were examined: quarter of year, health department district in which the nurse worked, completeness of the questionnaire, and case load of the nurse. No association was found with screening errors except in the instance of completeness of the reports. Table 4 shows that there is a significantly higher percentage of misscreening when the cases with incomplete reports (group 4) are compared to the rest. ($X^2 = 4.07$; $P < 0.05$ on 1 d. f.)

Since both the questionnaire and the examination have their basis in the Gesell Developmental Schedules, one should expect a high correlation between them. In order to examine this, the questionnaire was answered by using the findings of the developmental examination as the source of information. Scrutiny of the rating which results when it is answered in this manner indicates whether the same diagnosis

Table 4—Screening Errors Between Ratings of Nurse and Physician by Completeness of Questionnaire

Completeness of Questionnaire *	Rating Assigned: Overscreened Cases — Physician Normal	Overscreened Cases — Nurse Abnormal	Underscreened Cases — Physician Abnormal	Underscreened Cases — Nurse Normal	Physician Total	Nurse Total	Per cent Misscreened
1	451	14	43	16	494	30	6.1
2	162	5	16	4	178	9	5.1
3	31	2	5	0	36	2	5.6
4	52	7	5	0	57	7	12.3
Total	696	28	69	20	765	48	6.3
	$X^2 = 7.36$ $P < 0.05$ on 2 d. f.				$X^2 = 4.07$ $P < 0.05$ on 1 d. f.		

* 1 — Report considered unambiguous and complete.

2 — Answers omitted or written unknown, but neither assigned score for fields of behavior nor over-all rating would change if report completed.

3 — Answers omitted or written unknown, assigned score for field of behavior could change but over-all rating would not if report completed.

4 — Answers omitted or written unknown, both assigned score for fields of behavior and assigned over-all rating could change if report completed.

could have been reached from the questionnaire as from the examination itself. (This procedure will hereafter be referred to as the physician's questionnaire.) Table 5 compares the ratings from the physician's developmental examination with those from the physician's questionnaire; the ratings assigned from the nurse's questionnaire are re-presented for comparison. For the 696 cases called Normal on examination, the physician's questionnaire method calls 589 or 85 per cent Normal and 1 or 0.1 per cent Abnormal. For the 69 cases called Abnormal on examination, the physician's questionnaire also assigns an Abnormal rating in 43 or 62 per cent but a Normal rating in 5 or 7 per cent. This is considerably less over- and underscreening than was found by the nurse's questionnaire.

The association between underscreening and type of abnormality diagnosed at examination was previously shown in Table 2. Table 6 shows the results by type of abnormality for the physician's questionnaire and re-presents the ratings based on the questionnaire completed by the nurse for comparison. All 19 cases of intellectual defect and all 15 cases of serious neurologic abnormality are detected by the physician's questionnaire.* Of the 34 cases in the possible cerebral palsy group 17, or half, are called Abnormal while four are underscreened and called Normal. In the group of eight cases with retardation in motor development but normal neurologic potential, one is called Abnormal by the physician's questionnaire and one Normal. Thus there is a similar association of under-

* The two cases in the group of serious neurologic abnormality which were called unknown are not considered misscreened. They represent a special situation in the scoring of the questionnaire.

screening with the less severe abnormalities as was found for the nurse's questionnaire.

The five cases in the total Abnormal group of 69 which were assigned the discrepant rating of Normal by the questionnaire when it was answered from the findings of the developmental examination were analyzed individually to see why the physician's questionnaire failed to detect them. Review of the questionnaire, Figure 1, showed failure to include a question on standing behavior and the use of the legs in the upright position. Neither was provision made for questions on abnormal neurologic signs such as ataxic or athetotic movements, generalized hypertonicity or spasticity, or hemiparesis. Of these five underscreened cases, four are in the clinical category of "possible cerebral palsy." Three of these four cases were unable to support weight in the standing position, so that if a question on standing behavior had been included and properly scored, these three cases probably would not have been rated Normal. The fourth case had ataxic movements, especially of the trunk, and probably would not have been called normal if a question regarding abnormal neurologic signs could have been included. The fifth case, with retardation in motor development but normal neurologic potential which is called Normal by the questionnaire would not have been screened by correcting the questionnaire in either of these ways. While it was possible on the basis of the complete Gesell Developmental Examination to detect the finer degrees of retardation which led to a diagnosis of Abnormal, the questionnaire itself is too crude to do this.

Discussion

It is clear from the presentation of data that the screening instrument, the questionnaire as completed by the nurse, falls short of the goal that such an instrument should fulfill. Ideally, the screening device should refer all the cases for evaluation which the pediatrician, upon further examination, can confirm as abnormal and no cases which the pediatrician, upon later examination, will consider normal. In examin-

Table 5—Comparisons of Physician's Examination Ratings, Ratings from Questionnaire Using Information from the Examination and Ratings from Questionnaire Completed by Nurse

Ratings from Physician's Examination	Total		Ratings from Questionnaire Using Information from Physician's Examination				Ratings from Questionnaire Completed by Nurse			
			N	I	A	Unknown	N	I	A	Unknown
			(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Normal (N)	696	No.	589	106	1	—	519	145	28	4
		%	84.7	15.2	0.1	—	74.6	20.8	4.0	0.6
Intermediate (I)	136	No.	50	79	7	—	69	47	17	3
		%	36.8	58.1	5.1	—	50.7	34.6	12.5	2.2
Abnormal (A)	69	No.	5	19	43	2	20	15	31	3
		%	7.3	27.5	62.3	2.9	29.0	21.7	44.9	4.3
Total	901	No.	644	204	51	2	608	207	76	10
		%	71.5	22.6	5.7	0.2	67.5	23.0	8.4	1.1

Table 6—Type of Abnormality According to Rating from Questionnaire Using Information from Physician's Examination and Rating from Questionnaire Completed by Nurse

Physician's Examination Type of Abnormality	No. of Cases	Rating from Questionnaire Using Information from Physician's Examination				Rating from Questionnaire Completed by Nurse			
		N	I	A	Unknown	N	I	A	Unknown
All abnormal cases	69	5	19	43	2	20	15	31	3
Intellectual defect									
Without other abnormality	12	–	—	12	–	2	2	8	–
With other abnormality	7	–	—	7	–	—	2	5	–
Total intellectual defect	19	–	—	19	–	2	4	13	–
Serious neurologic abnormality									
Without intellectual defect	10	–	—	8	2	—	3	5	2
With intellectual defect	5	–	—	5	–	—	2	3	–
Total serious neurologic abnormality	15	–	—	13	2	—	5	8	2
Possible cerebral palsy									
Without intellectual defect	32	4	13	15	–	14	7	10	1
With intellectual defect	2	–	—	2	–	—	–	2	–
Total possible cerebral palsy	34	4	13	17	–	14	7	12	1
Retardation in motor development but normal neurologic potential	8	1	6	1	–	4	1	3	–

ing a number of issues relating to over- and underscreening, attention has been focused on those regarding the mother as a source of information and the nurse as a transmitting medium for entries on the questionnaire about which there was systematic data available. There are several additional factors relative to the questionnaire that reflection suggests might conceivably affect the amount of over- and underscreening but about which information had not been collected methodically in the screening program. Although for purposes of comparison it had been assumed that the pediatrician's diagnosis is correct, errors in diagnosis or in the method of scoring the examination will influence the agreement between examination and questionnaire. It is not possible to give extended consideration to the professional competence of the examiner or to the validity of the examining instrument except to mention that the pediatrician has spent 10 years in the clinical practice of developmental diagnosis and that the Gesell Developmental Examination is the most carefully developed and standardized of the procedures available for the developmental evaluation of infants.

Let us consider first the content of the questionnaire. Proper screening of abnormalities of all types necessitates the inclusion of items in the questionnaire that describe significant symptomatology of all the conditions the screening is designed to detect. If a crucial diagnostic sign is missing from the questionnaire, it will undoubtedly give rise to underscreening of the condition of which it is a sign. How did the questionnaire stand up in this light? It is of some interest to note that infants who were diagnosed in the pediatrician's examination as being most in

need of special management—the ones with intellectual defect and serious neurologic abnormality—were all considered abnormal when the questionnaire was completed by the pediatrician. This undoubtedly occurred because the handicap pervaded the total behavior and the questionnaire contained appropriate items reflecting this behavior. The pediatrician's questionnaire underscreened five cases where the abnormality was less striking and less pervasive. Reexamination of the questionnaire in the light of this underscreening suggests that the following question on standing behavior might be added to the questionnaire to improve its screening capacity for such cases:

Does the baby
a. Walk around holding on to furniture or his crib railing
b. Pull himself to standing
c. Stand holding on to furniture or his crib railing if you put him there
d. Stand if you hold him by the hands
e. Stand if you hold him under the arms

One of the cases which was undetected by the questionnaire had abnormal neurologic signs. The addition of questions on neurologic abnormalities of muscle tonus or control does not seem feasible, however, and the screening errors attributable to these factors alone probably cannot be reduced. It is the opinion of the authors that these additions would have improved the questionnaire as completed by the pediatrician. It seems very likely that analogous improvement would have taken place in the questionnaire when completed by the nurses, even when the other factors already mentioned continue to operate.

Second, did the particular phrasing of questions used in the questionnaire contribute to the over- and underscreening? One principle used in framing the questions was the avoidance of phrases that would induce the mother to upgrade the performance of her child. Also, we wished not to disturb unduly the mothers of clearly abnormal children. This attempt led to some loss of precision of the questions themselves and thus may have reduced their efficacy in detecting abnormal signs. For example, every effort was made to avoid the use of words such as "only" or "just." In the suggested addition to the questionnaire just cited, rephrasing part (e) to read "stand only if you hold him under the arms" makes it quite clear to the nurse what information is being sought. Unfortunately, it makes it just as clear to the mother.

Finally, were the questions scored and weighted properly to show up abnormality if it occurred? Comparison of the findings of the physician's examination and the physician's questionnaire suggests that there has not been any serious error in this regard.

Further work will be needed in order to develop this questionnaire for use in a child health conference. Many necessary refinements were not possible in a screening attempt that was geared to another large-scale study with a quite different focus. However, some comment on the nurse herself and her relationships with the physician who will follow up on her referred abnormals is in order.

The alert nurse, if she has the time, can help the screening procedure and can detect evidences of unreliability in the observations and reporting of the mothers. It is unfortunate that certain factors prevent optimal use being made of the nurse as an integral part of a good screening program. Anyone familiar with the case load of the typical public health nurse is aware of how little time she has available.

It has been stated [3] that the neuropsychiatric disorders of childhood are by far the most important and costly in terms of expenditures for the provision of therapy or custodial care, loss of pro-

ductivity, and family dislocations and hardships. As public health is turning to the consideration of the chronic diseases in its adult populations, then certainly in managing its child and infant populations it must devote more and more of its energies to the question of deviations in behavioral development. An integrated program of child hygiene today should include facilities for developmental diagnosis and supervision. The knowledge is at hand to enable detection of abnormalities in infancy when steps can be taken to plan for an environment, medically, socially, and educationally, which will enable the child to cope more satisfactorily with his disability and make the best possible use of his capacities.

Unfortunately, there are too few physicians trained in developmental diagnosis. Methods that can conserve the time of a consultant in infant development in the practical operation of a program are extremely valuable, and the development of a questionnaire which can be an efficient screening mechanism may be an important step forward. However, words of caution are necessary. In this area as in all others the institution of possible case-finding measures without provision of services for the cases found is a hazardous procedure.

In all phases of current well baby clinic organization there is a need for greater integration of the activities of the nurse and those of the physician. Constant interchange of ideas leads to a better understanding of what is happening in the family and is educational for both nurse and physician. Most important of all it contributes to the efficiency of the clinic generally and results in the provision of better services for the patient. In this regard it should be stressed that the questionnaire cannot be used mechanically, for in itself it has little value. Continuous consultation is necessary to improve the effectiveness of the screening device and the clinical judgment of the participating personnel. Only this can decrease the needless anxiety caused by overreferral of normal infants and the equally erroneous failure to find a case in need of care.

Summary

Public health nurses, using a questionnaire based on the Gesell Developmental Schedules, obtained information from the mothers concerning the behavioral development of their babies at approximately 40 weeks of age. A Gesell Developmental Examination done by a staff pediatrician was the standard against which the efficacy of the questionnaire as a screening device was measured.

Comparison of the nurse's report on 901 infants with the physician's examination on the same infants shows that the screening device falls short of the goal of referring for evaluation all those cases which the examination called abnormal and none of those diagnosed as normal. Approximately a quarter of the abnormal cases are not detected. The amount of the screening error is influenced by three types of factors about which information had been gathered systematically in the screening program. The first are clinical factors, such as type of abnormality as diagnosed by the examination. The second are factors concerning the child or mother such as the reliability of the mother's history. The third are factors involving the nurse such as completeness of reports.

A check on the validity of the questionnaire itself was made by studying the results when the observations recorded at the examination were used to answer the questionnaire. When this was done only 7 per cent of the abnormal cases were not detected and the questionnaire screened all cases of

intellectual defect and all cases of serious neurologic abnormality.

Some specific recommendations for developing the questionnaire and using it in a child health conference are made.

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". . . As we learn more and more about the prevention of disease, . . . we come to realize that many of our present ills could have been prevented, we are becoming less and less reconciled to the idea of suffering preventable disabilities. Sometime in the far distant future it may well be regarded as treasonous for government to allow illness, disability, or death from causes that could have been prevented by community-wide action."

(From an address given by Governor George M. Leader of Pennsylvania, August 18, 1955, at the Fourth Annual Health Conference, State College, Pa.)

What a Health Officer Expects of His MCH and CC Director

G. D. CARLYLE THOMPSON, M.D., M.P.H.

This address to the State Health Department MCH program directors has much to say to other departmental program directors as well. Further, the principles it sets forth apply with equal validity to similar interdepartmental relationships in those communities large enough to support a public health department with a program organization.

The subject appears at first glance—but at first glance only—to be a rather easy one. It is one that surely should be discussed by a health officer with his maternal and child health and crippled children's director during his orientation period and probably on other occasions during his term of service.

What the health officer might say could fall between two extremes. At one extreme is the administrator who says "The MCH and CC problem in this state is your responsibility; come and see me if you have any trouble." At the other extreme is the health officer who, after describing the problems in some detail and then outlining the program to meet these problems, says to the MCH and CC director "Now carry these out, reporting to me with some frequency on what you are doing and check with me before you change the program in any detail." But whatever the conversation between the state health officer and his MCH and CC director, it will clearly reveal the health officer's administrative attitude and philosophy to his program directors.

Naturally, you are interested in the administrative attitude and philosophy of the health officer. The success with which you are able to function depends both upon his attitude and philosophy, as well as on your own. Thus we see that this is a two-sided matter and the subject might have been purposely complicated by adding "What does a state MCH and CC director expect of a health officer?"

Relationship Between Health Officer and MCH and CC Director

What I have to say, or what any health officer would have to say, on this subject not only reveals what is expected of you, but it also reflects in a real degree the health officer's concept of his own administrative role and over-all responsibility for the public health program. While it is not possible to discuss here the administrative and over-all public health responsibility of a health officer, it undoubtedly has its effect on MCH and CC directors as on other program directors. Each of them, the health officer and the MCH and CC director, must recognize this and to a considerable extent must accept this responsibility in good faith. This requires a successful and generally har-

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monious working relationship between the health officer and program directors.

Many elements go into the making of a successful working relationship. I will list only a few. First, there is a need for mutual professional respect, which we may assume to exist since we are a group of persons who are basically professionally competent. Second, there is a need for mutual personal respect, which will exist if we are mature and are capable of objective consideration and action. Third, there is a need for staff loyalty, a basic essential most likely assured through the fourth, and the fourth is the need for successful communication. Successful communication being so basic and vital to successful and harmonious working relationship, I want to give it emphasis by further discussion.

The communication system must be two-way between the health officer and program director. Each of them has a responsibility. Shirking this responsibility by one of them is not sufficient reason for shirking by the other. But rather it must be considered a challenge as a part of the job until every effort and device has been tried. Keeping before us three important factors may help in the realization of this two-way system. These factors are desire, opportunity, and sufficient time for communication.

But even with mutual understanding and mutual determination for successful communication, situations will arise because of the pressure of responsibilities that will not always allow for full communication. Especially at these times it is essential that there be such confidence in each other's activities that without the benefit of discussion each knows what the other would do or say or think in a given situation. While this degree of understanding is not realized during the early period of the employment relationship, it should begin at that time. However, having established a basis of good communication and maintaining it as the employment relationship continues, this degree of understanding will result.

Scope of the MCH Program

Further, it is next necessary to establish the scope and nature of maternal and child health and crippled children's activities. Its scope is very broad. Its nature is vital. It deals with the lives and well-being of mothers and children.

This concept, coming from the Children's Bureau, originated in the days of Theodore Roosevelt in 1912 when the Children's Bureau was founded and when the idea of the whole child was fostered. Some of you may not like the term "whole child." I share such feelings when I hear the term misused to suggest that any particular agency or professional group must be responsible for the "whole child." It is a good term if all of us use it consistently to remind ourselves that the "whole child" is a product of the family, the parents, the community, and the school. Having this concept, we will not forget that our role requires constant consideration of others in problem analysis, program planning, and operation in any matter concerning a single child or a group of children.

While health departments obviously cannot and do not have responsibilities for all phases of problems concerning the whole child, they very properly must be concerned primarily with all health aspects of the needs of children. The area is so very broad that it not only implies but requires that the health department must relate itself in an understanding and cooperative way with all other agencies that serve children.

Within the health department itself MCH services, by reason of the age span of mothers and children, touch upon almost every activity of the department. This too makes the program a broad

one. It includes work in all phases of maternity, infancy, preschool, and school children. It involves communicable diseases, tuberculosis, venereal disease, dental health, rheumatic fever, heart disease, and even cancer, along with other chronic and disabling conditions. It includes accident prevention, including motor vehicle accidents. It is concerned with sanitary matters, statistics, public health nursing, and educational activities. It includes the social aspects of illness. Some of these activities, particularly communicable disease, dental, public health nursing, and health education services, which in many states are the principal duties of other than MCH and CC program directors, involve in a large measure the child-age population.

And what is the child-age population? Over 27 per cent of our people are 15 years of age or under. About 4,000,000 are born annually, thus each year the MCH and CC interest should serve this nation through 50,000,000 Americans. I know of no other area of health interest that is so broad.

The MCH Director

Turn now to the MCH and CC director who is in a logical position to exercise the broad over-all interest and responsibility which is required. This is not to say that the MCH and CC program director must establish a small health department within the department with complete administrative responsibility for all health activities relating to children. Each state health department must in its own situation determine this administrative relationship. But regardless of how the administrative relationship is determined, there must be a joint working basis established between all program directors and parties concerned. This over-all general interest of the maternal and child health and crippled children's director can operate without empire building and without administrative conflict in several ways: (1) in the direct administration of some services and in cooperative efforts with others, (2) in studying problems, (3) in stimulating program developments in fields where it is needed, and (4) in the direction of some related activities when direction is not otherwise provided. To do these things the MCH and CC director should have certain qualifications, in fact, very definite qualifications, both personal and professional.

MCH Director Qualifications

Professionally he must know a great deal. Those states which use the Professional Examination Service of the American Public Health Association know that the written examination for the position of maternal and child health and crippled children's director contains 30 questions on administration, half of which are on MCH administration; 35 questions on communicable diseases, tuberculosis, and venereal disease; 20 questions each on public health law and statistics; and 15 questions each on health education, nutrition, obstetrics, pediatrics, public health nursing, and school health; 10 questions on mental hygiene, and 5 questions on oral hygiene. The job specification for MCH and CC director positions in many states requires a thorough knowledge in these fields.

It also requires special personal traits, such as emotional maturity, personal integrity, common sense, understanding of human nature, patience, cooperativeness, and enduring leadership. It requires a desire to be of service to people, the ability to see objectives clearly and to adapt procedures and methods to obtain the objectives. It requires ability to establish and maintain good working relationships with the public and with staff, the

ability to organize and supervise a staff and to delegate responsibility effectively. It requires the ability to prepare and present effective written and verbal materials for educational and public relations purposes.

General Expectations

It is clear that we are expecting the MCH and CC director be a very unusual person with very special professional and personal qualities. Some of the qualifications are more important than others. Not all persons have all of these qualifications in the same high degree, to be sure, but a successful MCH and CC director cannot fall too short in any regard. Having such a person on a staff should minimize the problem of what to expect from an MCH and CC director and it would seem completely out of order for me to be specific in telling you what is expected of you. I feel certain that you already know this and that you would function accordingly, even without the health officer, except that since other program directors are also highly qualified in their fields and are vitally interested, it becomes necessary by the nature of things that there be a health officer to give general direction and guidance to the health department team. The health officer then should be able to assume that the members of the team would be responsive to the general direction and guidance of the health officer. Within this framework there are certain definite things that may be expected of the program director.

First, through conference, discussion, and possibly debate, both within the staff and with outsiders, the program director is expected to determine the program needs, to arrange these needs in some order of priority, to recommend programs to meet the needs, such programs being both long-ranged and geared with a practical eye to the immediate future. The director is expected to study and evaluate programs continuously in terms of meeting the needs for which they were planned and to review these needs both as to their continued priority and for necessary program changes. In doing these things he is expected to maintain a constant recognition and working relationship with other staff workers also involved and concerned with various aspects of the MCH and CC program, such as public health nurses, health educators, dentists, engineers, sanitarians, laboratory staff, statistical staff, and other medical program directors. He is also expected to maintain a constant recognition of working relationship with other health workers not members of the health department staff, but who are indirectly members through the practice of medicine, dentistry, nursing, hospital administration, and other health services.

These qualifications apply to all program directors, but not all in the same degree. They are most important for those directors concerned with maternal and child health and crippled children's activities, for I believe that no other state program director's activities are as broad in their scope and cross as many lines and channels of activities as those of the MCH and CC director.

Specific Expectations

Still there are some very specific aspects about the MCH and CC program that should be discussed.

It is said that with the decline of infant, maternal, and communicable disease mortality—even morbidity—and with better medical care being available to people because of better economic status, there is reduced need for maternal and child health and crippled children's services. If we continue to think of mortality as the basis for measuring our activities, there would

be some justification for this viewpoint. In the days of high mortality it was comparatively easy to justify a schedule of activities aimed at the reduction of the mortality. Using this mortality yardstick, measurement of progress was relatively simple. While well-being, too, was important to people in the days of high mortality, it is understandable that a program focused at well-being had to wait until the problem of the unnecessary loss of lives was resolved.

Yet someone recently reported that even with our lower infant and maternal death rates more productive years of life are lost from infant deaths today than from all cancer and heart deaths combined. The job of reducing maternal and infant mortality is not over. It cannot be said that we have reached the irreducible number of deaths in pregnancy, infancy, and childhood. For some years we have been talking about persons living a useful and happy life, not just avoiding death.

The job of the MCH and CC director today continues with no less importance than in the past. Not only does he strive to further reduce mortality, but also he strives to develop programs which help those mothers and children that live to enjoy good health and to help all children become useful and happy citizens as they grow into adulthood. That the area of activity is large has already been pointed out.

In the past the principal measure, and in most cases the sole measure, of accomplishment has been the reduction of the mortality rate. In the future there must be added some other measure of accomplishment for these programs the objective of which is the well-being of children. The need for measuring such health status of children or the need for measuring the benefit to the community of this health status of children must be met if we are to support appropriation requests with justification that legislative bodies and others can understand and appreciate.

Even though infant and maternal mortality are declining—even though services for children previously relegated to inadequacy and in some cases, total dependency, have been developed, giving such children lives of greater usefulness—even though treatment and rehabilitation services for children, prohibitive in cost in many areas and unavailable in some, have become available regardless of cost—even though these things have been done, are these services reaching all of the children that need them? Do MCH and CC programs today result in the nation's securing the maximum usefulness of all of its citizens including the unborn? Are the more than 1,000,000 young people living today, who would have died had the infant mortality rate of 1936 prevailed, serving the nation to their maximum usefulness or will they be able to serve the nation to this extent when they reach the age of maturity? Is this maturity only chronological, or is it emotional and mental, too? Are these people having the maximum well-being and are they able to serve the nation with maximum usefulness?

In the field of nutrition, in medical and dental supervision there are still inadequacies in many areas. Home accident prevention is a challenge. Juvenile delinquency and the betterment of the mentally retarded child are presenting challenges both now and for some time to come. In the field of maternity, the problem of perinatal deaths is before us. Certainly, in the field of health education the program for the teaching of youngsters in school is inadequate. We are still searching for the most effective method to teach health to children so that they, as adults, will have a proper understanding of their personal and community health responsibilities in terms of their maximum usefulness as citizens. Cer-

tainly, above all other groups the child when educable is the approach to meeting this nation's need for securing the maximum usefulness of its citizens. This is the basis for securing a population with adequate intelligence about health matters. The nation has a right to expect each citizen to be of maximum service within his capacity.

Challenge, Responsibility, and Leadership

The MCH and CC directors have a challenge and responsibility in these fields that is unmatched in any other phase of health department activities. It is unmatched in scope; it is probably unmatched in difficulty. The MCH and CC director should not be discouraged, for the approach years ago to the problem of infant and maternal mortality was a real challenge, too. It was the first program to be developed in cooperation with the general practitioner that did not relate strictly to sanitation or communicable disease control. The technic of approaching the problems of maternal mortality was then new. The cooperative relationship with private physicians was new. It has proved successful. This technic is being used in other fields of public health today, particularly in the approach to the problem of chronic disease. Having achieved great success in the past, MCH and CC directors should be encouraged and determined to proceed with other problems concerning mothers and children today.

In summary, the duties and responsibilities of yours, which are broad and comprehensive, call for careful planning and analysis. They require the closest possible cooperation with others, both within the health department and without. This assumes in you a person of special qualities, both professional and personal, and specifically one of vision with a special capacity for leadership and ability to understand and work with others. It requires patience without losing the determination to reach your goal, both immediate and long-range. The continued importance of the broad responsibility, which is yours, indicates that you are expected to continue with even greater effort the program of maternal and child health and crippled children's services. Pointed out are the need for, and the difficulty in, establishing a means of measuring the valuable results of your efforts in the future. All of this requires a special kind of leadership, a leadership with diplomacy, a leadership with energy, and a leadership with personal and professional competence to find the way to bring about this approach to healthy citizens by every means that is available in childhood. Able MCH and CC directors will give this kind of leadership.

As MCH and CC directors you have a challenge and responsibility to offer this kind of leadership, and to say as did Socrates in 400 B.C., "Could I climb to the highest place in Athens, I would lift up my voice and shout: 'Fellow citizens, why do ye turn and scrape every stone to gather wealth and take so little care of your children to whom one day you must relinquish it all?'"

The Ecology of Infectious Hepatitis

ABRAHAM GELPERIN, M.D., Dr.P.H., F.A.P.H.A., and WALLACE HAMPTON

A major outbreak of infectious hepatitis in Des Moines and Polk County (Iowa) during 1952–1953 permitted an evaluation of the effect of environmental conditions upon the pattern of the epidemic.

Although reporting of infectious hepatitis was not mandatory prior to 1952, it was the collective opinion of our medical profession that more cases had been cared for during the epidemic period than during the previous 20 years. The first six cases, reported in September, 1952, occurred in a single family. With the reporting of an increasing number of cases during the remainder of the year, the City-County Health Department held a conference with the child health committee of the County Medical Society to determine policy for practicing physicians and school authorities. It was decided to exclude a child of school age with infectious hepatitis for a minimum of four weeks after onset of illness, and to urge a change in state regulations pertaining to adults to specify clinical recovery rather than a seven-day period as the minimum time of release from public health control. In addition, healthy school-age contacts were to be permitted to return to school 24 hours after receiving gamma globulin prophylaxis. The agreed routine treatment was 1.0 ml per 25 pounds body weight to a maximum of 4.0 ml. All familial contacts regardless of age were to be strongly urged to avail themselves of this preventive.

The medical profession and school authorities were kept informed of the status of the disease outbreak and the community was alerted, especially to the usefulness of gamma globulin. The supply of the preventive, however, was limited initially, but during January, 1953, adequate supplies were made available to our Health Department that resulted in a definitely accelerated utilization, as well as case reporting. Neighborhood and school investigations by Health Department and public school nurses uncovered a few unreported cases that had occurred during the last four months of 1952, which added to the completeness of the total study. The efficacy of gamma globulin as a prophylactic was continually recounted, which resulted in an unusual degree of reporting of cases of infectious hepatitis by the citizenry.

A total of 544 persons with infectious hepatitis were reported in all of Polk County during the period of study, of which 384 occurred in Des Moines. Reported cases were clinically ill, investigations for subclinical cases were not undertaken by either practicing physicians or the health department.

All cases and family contacts were tabulated by the usual criteria, as well as census tract, and environmental factors, such as water supply, sewage disposal, and susceptibility to surface water flooding. In addition the city's 44 census tracts were separated into three socioeconomic levels. Census data [1] and Health Department information were utilized. Group I, the top

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level comprised those census tracts in which the bulk of the population had yearly incomes greater than $5,000, Group II, the middle layer was between $2,000 and $5,000, and Group III, the lowest stratum was less than $2,000. The professions, merchants, and executives predominated in Group I, and home values were highest, averaging more than $9,000 valuation. Group II was composed, in the main, of white collar workers, skilled laborers, and store keepers. Group III included unskilled and transient labor, pensioners, and the bulk of the nonwhite population. Home values in this level averaged below $5,000 valuation. Factors such as plumbing facilities and the persons per room ratio were also utilized. Group I composed 27 per cent of the city population, Group II, 57 per cent, and Group III, 16 per cent.

The population of Des Moines and Polk County was estimated for 1953 by projecting changes in census for each age group and race within each census tract from 1940 to 1950 into 1953.[1, 2] The estimated nonwhite population for Des Moines of 8,782 had a total of 12 cases reported during the epidemic period, 1.37 per 1,000. The cases in the nonwhite populations were deleted from all subsequent calculations. The 372 cases in the white population of Des Moines, 2.11 per 1,000, and 160 cases in the remainder of the county, 3.09 per 1,000 white population were studied.

The distribution of reported cases in Des Moines from September 1, 1952, to September 1, 1953, showed the usual pattern. The rate of 2.85 for the 13 weeks subsequent to September 1, 1952, rose to 10.23 during the winter quarter. The rate remained high, 10.46 during the spring 13-week period, dropping to 5.08 per 1,000 population for the last quarter of the study year. The disease has remained at an endemic level in our area, 109 cases being reported from September 1, 1953, to September 1, 1954, in the city alone, and 76 in the county. This data will be discussed later. Reporting continues at a high level because the Health Department remains the only source of gamma globulin.

Table 1 presents the basic information. The cases are classified by age group, sex, and socioeconomic level. Age group five to nine and 10–14 were combined since there was no statistically significant difference between these two periods of maximum incidence. The attack rates in general increased with a decrease in socioeconomic status. Factors such as city water or well water supplies as well as milk supply were found not pertinent. Cases of infectious hepatitis in two census tracts that have small constant flowing streams running through the areas that are subject each year to flash flooding with disruption of private sewage disposal systems and area contamination were pinpointed on a map. There was neither clustering nor crowding of cases along the streams themselves.

Utilizing a soil survey of all unsewered areas of the city and county that had been prepared by soil scientists from the Agronomy Division, Iowa State College, and Health Department information concerning the water absorptive capacity of various soil types, it was determined that there was no concentration of cases in areas with poorly absorbent soils. However, it is perhaps pertinent that a portion of fluid that runs into the tile field of a septic tank sewage disposal system is lost through surface evaporation of effluent. Surface contamination of these areas is an unproved probability. There are two reports that suggest a relationship between infectious hepatitis and surface soil contamination by human excrement.[3, 4] Sporadic cases only of hepatitis were reported in the Raccoon

Table 1—Reported Cases of Infectious Hepatitis, Des Moines, Iowa, September 1, 1952—September 1, 1953 (Caucasian Population)

City	No. of Census Tracts	Age Groups Sex	0-4 M	0-4 F	0-4 T	5-14 M	5-14 F	5-14 T	15-19 M	15-19 F	15-19 T	20-29 M	20-29 F	20-29 T	30+ M	30+ F	30+ T	Total M	Total F	Total T
Group I	9	Cases	0	1	1	10	9	19	1	2	3	1	2	3	2	4	6	14	18	32
		Pop.	2,507	2,257	4,764	3,376	3,318	6,694	1,102	1,338	2,240	2,809	3,391	6,200	12,224	14,386	26,610	22,018	24,690	46,708
		Rates Per 1,000		0.44	0.21	2.96	2.71	2.84	0.91	1.49	1.23	0.36	0.59	0.48	0.16	0.28	0.23	0.64	0.73	0.69
Group II	23	Cases	7	5	12	89	80	169	4	12	16	17	9	26	16	14	30	133	120	253
		Pop.	5,091	4,932	10,023	7,390	7,171	14,561	3,119	3,652	6,771	8,465	9,390	17,855	23,582	27,915	51,497	47,647	53,060	100,707
		Rates	1.37	1.01	1.20	12.04	11.16	11.61	1.28	3.29	2.36	2.01	0.96	1.46	0.68	0.50	0.58	2.79	2.26	2.51
Group III	12	Cases	0	1	1	33	32	65	2	3	5	3	5	8	1	7	8	39	48	87
		Pop.	1,182	1,146	2,328	1,615	1,554	3,169	761	1,162	1,923	2,666	3,101	5,767	7,618	7,964	15,582	13,842	14,927	28,769
		Rates	....	0.87	0.43	20.43	20.59	20.51	2.63	2.58	2.60	1.13	1.61	1.39	0.13	0.88	0.51	2.82	3.22	3.02
	44	Cases	7	7	14	132	121	253	7	17	24	21	16	37	19	25	44	186	186	372
		Pop.	8,780	8,335	17,115	12,381	12,043	24,424	4,982	6,152	11,134	13,940	15,882	29,822	43,424	50,265	93,689	83,507	92,677	176,184
		Rates	0.80	0.84	0.82	10.66	10.05	10.36	1.41	2.76	2.16	1.51	1.01	1.24	0.44	0.50	0.47	2.23	2.01	2.11

Table 2—Case Rates of Infectious Hepatitis in Partially Sewered Census Tracts by Type of Sewage Disposal System Compared to Sewered Areas of Same Socioeconomic Group

Socio-economic Group	Census Tract	Per cent City Sewer	Pop. with City Sewer	Cases of I.H.	Rate per 1,000	Per cent Privy	Pop. with Privy	Cases of I.H.	Rate per 1,000	Per cent with Septic Tanks	Pop. with Septic Tanks	Cases of I.H.	Rate per 1,000	Total Rates
II	1	2	83	0	0.0	47	1,958	32	16.34	51	2,125	19	8.94	12.24
	2	60	2,665	6	2.25	21	933	7	7.50	19	844	5	5.92	4.05
	19	40	1,751	14	8.00	40	1,751	9	5.14	20	876	9	10.27	7.31
	40	20	264	0	0.0	8	105	0	0.0	72	949	3	3.16	2.28
	44	70	1,784	12	6.73	17	433	6	13.85	13	331	2	6.04	7.85
	Total		6,547	32	4.89		5,180	54	10.42		5,125	38	7.41	7.36
	Remaining 18	95+	83,855	129	1.54									
III	20	5	74	5	67.57	65	963	3	3.12	30	444	2	4.50	6.75
	35	0	0	0	0.0	100	289	5	17.30	0	0	0	0.0	17.30
	36	20	400	2	5.00	80	1,601	19	11.87	0	0	0	0.0	10.49
	38	20	440	8	18.18	77	1,692	9	5.32	3	66	2	30.30	8.64
	39	5	60	2	33.33	35	417	2	4.80	60	715	2	2.80	5.04
	Total		974	17	17.45		4,962	38	7.66		1,225	6	4.90	8.52
	Remaining 7	95+	21,609	26	1.20									
II and III	Grand Total Partial Sewer		7,521	49	6.52		10,142	92	9.07		6,350	44	6.93	7.70
II and III	Grand Total Sewer		105,464	155	1.47									

River watershed, the water supply of Des Moines.

The important variants were family size, socioeconomic status, crowding, and kind of sewage disposal. Since a house-to-house survey of the census tracts that had private sewage disposal systems was completed during the summer of 1952, the locations of privies and septic tank sewage disposal systems were known (Table 2). Ten census tracts had city sewerage facilities for 70 per cent or less of the households; the remaining 34 census tracts had better than 95 per cent common sewer service. It became evident that the case rates in the few partially sewered tracts were, on the whole, appreciably higher than the remainder of the census tracts within the respective socioeconomic levels. When the 10 tracts are combined a higher rate for homes with privies as compared to septic tank systems or on city sewer is noted. The latter two are comparable. However, the hepatitis rates in homes on city sewer in these 10 partially sewered census areas are appreciably higher than homes in comparable sewered census tracts (Table 2).

In Des Moines and Polk County there has been considerable building of medium and high priced homes in non-sewered areas primarily because areas with sewers suitable for home building were less available, and no requirement for installation of common sewerage facilities was mandatory. The lack of extension of city sewers to the areas resulted from many of the reasons that are extant in other communities, lack of long-range development plans, incomplete or no zoning control, World War II and its severe restrictions, sharply rising costs, marked rise in internal as well as external urban fringe populations, etc. It may be added that our experience in infectious hepatitis, coupled with a relatively new community government, has resulted in recent action that will extend common sewerage facilities in the future to the city population not so served at present.

During the summer and early autumn of 1952 a major outbreak of another primarily "fecal-oral" disease occurred in Des Moines, a total of 313 cases of poliomyelitis in the city's white population preceded the infectious hepatitis epidemic.[5] A restudy of the poliomyelitis epidemic showed (Table 3) that there was no relationship to type of sewage disposal as was observed in infectious hepatitis. The highest attack rate was in Group I in poliomyelitis in contradiction to the infectious hepatitis experience. The attack rates in poliomyelitis were based on ages 0–59 only; since no cases over age 54 were reported, whereas two cases of infectious hepatitis were reported in persons in the seventies. No cases of infectious hepatitis were reported under one year of age and only three cases between one and two years of age.

Table 3—Relation of Poliomyelitis Attack Rate,* Des Moines, 1952, to Socioeconomic Level and Sewage Disposal

Group	Sewage Disposal	Population	Cases	Rate per 1,000
I	Sewer	40,963	116	2.83
II	Sewer	71,584	124	1.73
	Partial sewer	15,406	27	1.75
III	Sewer	17,735	36	2.03
	Partial sewer	6,284	10	1.59

* White population, ages 0–59.

An evaluation of the incidence of infectious hepatitis in the county outside of Des Moines also showed different attack rates for various areas which reflected the possible influence of type

of sewage disposal. Three towns bordering the city, by contract, tap into the city's sewer lines. They have a combined estimated population of 9,570, experienced eight cases, 0.84 per 1,000. These areas are primarily in socio-economic Group I. A veterans' housing development, which utilizes converted army type barracks on a recently deactivated army post, had a population of 3,680 with 22 cases. This emergency facility is also on city sewer, but is badly overcrowded. There are four to six family units in each wooden type two-story converted army barrack. This area is in Group III and had a 5.94 per 1,000 attack rate which probably reflects the effect of severe congestion.[6] The remainder of the county, calculated population 38,578, had 130 cases for a rate of 3.37 per 1,000. The latter is a mixture of unincorporated urban fringe, nine small towns and rural population, all serviced by private sewage disposal systems.

An additional factor is family size. The average family with one case of infectious hepatitis is larger than the size of the city's average family, 5.07 people compared to 3.04 persons. In addition the families with co-primary or secondary cases are still larger, on the average 6.94 family members. This finding is modified by a difference in utilization of gamma globulin and will be discussed later. The age grouping of the primary and co-primary cases in families with more than one case are comparable to the persons with infectious hepatitis in families with but one case. There were no significant differences between the sewered and partially sewered areas as to age groups attacked or average family sizes.

The experience within public and parochial schools paralleled the area's incidence of disease. The rates, on the whole, were highest in the grade schools. Some grade schools in Group I areas had no cases of disease, while grade schools in the partially sewered areas had the highest rates, as high in one instance as 76.92 per 1,000 pupils. The difference between grade schools reflected the differences in infectious hepatitis rates for their respective areas. A study of the cases in two schools with the highest attack rates showed a skipping about of the cases between the various rooms when plotted by weeks of the school year. Approximately one-fourth of the rooms had no cases. There also was a one- to two-month hiatus, as a rule, between cases in the same classroom. One school had a septic tank sewage disposal system and the other a special city sewer extension to the school. Gamma globulin prophylaxis was not used for classroom contacts, per se.

The effectiveness of gamma globulin as a preventive in households with clinical infectious hepatitis is shown in Table 4. It is noted that in those 475 familial contacts not receiving gamma globulin there were 37 secondary cases, 13 of which occurred during the first week after diagnosis of the primary case. In contradistinction a total of nine cases occurred in the 837 familial contacts who were injected with gamma globulin, four of which occurred during the first week postinoculation.[8-10] The great majority of the inoculated contacts received the prophylaxis by the day after diagnosis of the disease within the family. If the experience in the unprotected group is projected into the protected group, there would have been 65 cases, a saving of 56 cases of infectious hepatitis. There is a suggestion of a greater utilization of gamma globulin in Group I and the least use in Group III. During the entire period gamma globulin was available on a purely voluntary basis. Even when freely available in January, 1953, there were some families and individuals who, for various reasons either did not avail themselves of the prophy-

Table 4—Effectiveness of Gamma Globulin Prophylaxis

A—Cases of Infectious Hepatitis Among Familial Contacts Not Receiving Gamma Globulin

Age Group	Number of Contacts	Days After Diagnosis of a Case				
		Under 7	7–13	14–20	21 Plus	Total
0–4	64	1	2	0	2	5
5–9	62	4	3	0	3	10
10–14	40	4	3	2	3	12
15–19	28	2	0	0	0	2
20 plus	281	2	1	1	4	8
Total	478	13	9	3	12	37

B—Cases of Infectious Hepatitis Among Familial Contacts Receiving Gamma Globulin

Age Group	Number of Contacts	Days After Innoculation				
		Under 7	7–13	14–20	21 Plus	Total
0–4	164	0	0	0	0	0
5–9	176	1	0	0	1	2
10–14	118	2	2	0	1	5
15–19	50	0	0	0	0	0
20 plus	329	1	0	1	0	2
Total	837	4	2	1	2	9

lactic or who were somehow missed.

An investigation was made into possible explanation of why 36 of the 317 afflicted families in Des Moines had secondary cases. Table 5 presents the age grouping by socioeconomic level and sewage disposal status for families with one case only. It is observed that 64.7 per cent of all familial contacts in the 281 families with one case only utilized gamma globulin; whereas, in the 36 families with secondary cases only 45.4 per cent availed themselves of prophylaxis. Age distributions are similar. Of the eight families with co-primary cases, five had at least one secondary case, in each instance a familial contact not receiving gamma globulin.

An investigation of the relationship of congestion in the household and infectious hepatitis—utilizing the census bureau criterion of greater than 1.50 persons per room as the dividing line—shows (Table 6) that families with infectious hepatitis, except for Group I, had a definitely greater degree of household congestion than for all families within their respective socioeconomic groups. The families with more than one case have a tendency toward the greatest degree of household congestion. The previously reported experience in a veterans' housing project also emphasized this fact.

From September 1, 1953, to September 1, 1954, a total of 109 cases was reported in Des Moines, of which three were in the nonwhite population. Seventy-six cases occurred in the remainder of the county. Preparation of data for the second year of experience

showed a fairly constant incidence throughout the year with no peak period. The attack rates in the white population adjusted for 1954 [1, 2] during the second year of high morbidity was 0.46 per 1,000 in socioeconomic Group I. The sewered census tracts in Group II had a 0.58 per 1,000 rate compared to 1.10 per 1,000 in the comparable partially sewered tracts. The rate in the sewered Group III areas was 0.47 and 0.83 in the partially sewered counterpart. The over-all city rate in the white population was 0.59 per 1,000.

The three bordering towns with common sewerage facilities had only two cases in an estimated population of 10,050, 0.2 per 1,000. The veterans' housing area had nine cases in a population of 3410, 2.64 per 1,000. The remainder of the county had 65 cases, estimated population 39,350, a rate of 1.65. The decline in the attack rates during this second year was 72 per cent for the city compared to 51 per cent in the nonsewered county. The differential in Des Moines between sewered and partially sewered areas decreased from a ratio of 1.0 to 4.44 during the epidemic year to 1.0 to 1.9 during the subsquent year.

The differences in average family size continued during the second year, however, with a somewhat smaller differential. Families with one case of infectious hepatitis averaged 4.43 persons, and families with more than one case averaged 5.14. The age grouping in the city's original and co-primary cases was similar in the 1953–1954

Table 5—Age Group of Familial Contacts in Families with One Case of Infectious Hepatitis

	Number of Families	Status of Prevention	Age Groups 0–4	5–9	10–14	15–19	20 Plus	Total
Group I	27	Gamma globulin	19	14	10	2	48	93
		No gamma globulin	3	4	2	1	11	21
Group II								
A. Sewer	114	Gamma globulin	56	56	44	26	113	295
		No gamma globulin	25	23	10	7	117	182
B. Partial sewer	79	Gamma globulin	40	58	35	16	82	231
		No gamma globulin	10	5	8	6	57	86
Group III								
A. Sewer	18	Gamma globulin	12	5	6	1	19	43
		No gamma globulin	1	4	1	0	15	21
B. Partial sewer	43	Gamma globulin	10	20	11	4	33	78
		No gamma globulin	14	14	9	8	49	94
Total	281	Gamma globulin	137	153	106	49	295	740
		No gamma globulin	53	50	30	22	249	404

Table 6—Relationship of Household Congestion and Infectious Hepatitis Morbidity

			Number of Households	Per cent Household 1.50 Persons Per Room	Combined Per cent
		Over-all average	13,615	0.92*	0.92
Group I		Single case families	27	0.00	
		Multiple case families	2	0.00	0.00
		Over-all average	26,576	2.68*	2.68
	Sewer	Single case families	114	7.89	
		Multiple case families	7	14.29	8.76
Group II		Over-all average	4,436	8.40*	8.40
	Partial sewer	Single case families	79	10.13	
		Multiple case families	17	23.53	12.50
		Over-all average	9,547	7.82*	7.82
	Sewer	Single case families	18	27.78	
		Multiple case families	2	100.0	35.00
Group III		Over-all average	2,186	12.50*	12.50
	Partial sewer	Single case families	43	23.26	
		Multiple case families	8	37.50	25.49

* 1950 census information.

period to that in the 1952–1953 year of study.

There was a definitely greater utilization of gamma globulin during the second year with only 24 familial contacts of a total of 332 not receiving prophylaxis. Three secondary cases occurred, all within seven days of diagnosis of the primary case in the nonprotected group, compared to three cases in the 298 persons receiving gamma globulin. In the latter, the three failures occurred within two weeks after inoculation. These findings accentuate the proved effectiveness of gamma globulin prophylaxis.

The per cent of familial contacts in families with one case of infectious hepatitis within various age groups was essentially the same for the two years of study. A positive relationship of household congestion to incidence of the disease continued to the same degree during the second period September 1, 1953, to September 1, 1954.

Summary

A major outbreak of infectious hepatitis in Des Moines and Polk County, Iowa, presented an opportunity to study certain environmental factors. The

kind of individual dwelling, as well as area sewage disposal was found to be of significance. Family size and household crowding were also important factors. In addition, the utilization of gamma globulin prophylaxis for familial contacts reduced the number of subsequent cases from 77.8 per 1,000 unprotected familial contacts to 10.8 per 1,000 protected familial contacts during the first year of study.

An evaluation of the subsequent 12 months' experience tended to confirm the observations noted above.

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Institute of Agricultural Medicine

What is said to be the nation's first Institute of Agricultural Medicine has been established at the University of Iowa with the help of the W. K. Kellogg Foundation. According to the announcement, the institute has been "set up to conduct medical and social research on the diseases to which farm people are especially susceptible, and to develop new preventive measures to safeguard the farmer's health." Such problems as the diseases transmitted from animal to man, impurities in water, milk, and milk products, skin diseases due to contact with chemicals and plants, the effects of chemical fertilizers and insect sprays both on the farmer and consumer, effects upon consumer health of drugs used to accelerate growth of animals for food purposes, and farm accidents will be studied. The first task will be to determine "the number, extent and importance of health problems confronting the farmer."

The Kellogg Foundation has made a grant of $109,000 for the Institute of Agricultural Medicine, $37,000 for the first year beginning September, 1955, $44,000 the second year, and $28,000 for the third year when matching funds from state appropriations are expected to be available. It is expected that there will be complete state support thereafter.

The institute is a division of the Department of Hygiene and Preventive Medicine under the jurisdiction of Franklin H. Top, M.D. It collaborates with other departments of the university—the various departments of the College of Medicine and the State Hygienic Laboratories, as well as with the Division of Veterinary Medicine at Iowa State College.

Water as a Sodium Source and Its Relation to Sodium Restriction Therapy Patient Response

EDMUND J. LAUBUSCH and CHARLES S. McCAMMON, M.D., F.A.P.H.A.

Presented here is a pointed example of interrelationships and interdependence of professional disciplines in the public health field. In the application of this study's findings the sanitary engineer, the clinician, the pathologist, the dietitian, and the public health nurse all may become involved.

All natural waters contain suspended or dissolved mineral matter and inorganic salts, in addition to the vast range in types and numbers of microorganisms that may be prejudicial to man's health. Some of these may exert irritating and deleterious physiologic effects; others may be metabolized with benefit, as supplements to normal nutritional requirements.

Tolerances for the mineral content of water supplies are closely related to the hypersensitivity of some individuals to specific materials. For example, the physiologic mechanisms of travelers and newcomers to many communities frequently are upset by a sudden change in water quality. In most cases this is only a temporary response, after which the normal individual soon becomes adjusted. However, where normal physiologic mechanisms are impaired, the unique capacity of the body to make the necessary adjustments breaks down. This paper deals with the problem as it relates to patients for whom total salt (sodium) intake appears to be a significant factor in the development of edema.

Salt and Water Balance in the Human Body

Normally, physiologic, regulatory mechanisms function in such a manner that ingested salt, in excess of those minute but essential quantities required by properly functioning body tissues, is excreted. This is accomplished largely by the kidneys which have the capacity to retain variable amounts of sodium as the situation demands.

For reasons that have not been fully established, the mechanisms which are responsible for adjusting the body's sodium output rapidly and precisely, despite wide variations in intake, fail to function properly in several very common diseases of the heart, kidney, and liver. Some patients whose normal renal and certain glandular mechanisms are impaired are unable to rid themselves of sodium; consequently, large amounts of sodium-containing, extracellular fluid accumulate, producing edematous tissues. Edema limited to the periphery (e.g., dependent edema of the extremities) produces discomfort and minimal compromise of organ function; edema fluid localized in more central areas (e.g., the pleura or the pulmonary alveoli) poses a serious threat to the life of the patient.

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Since the early 1920's, in an attempt to prevent or at least to reduce the rate of edema formation, physicians began to treat patients who tended to become edematous by regulating their sodium intake.[1] The results, however, were not widely accepted until about 10 years ago when Kempner recommended a diet which again focused attention on dietary sodium restriction in the treatment of specific disorders.[2] Sodium restriction diets are now widely prescribed for persons suffering from hypertension and certain types of cardiac, renal, and hepatic disorders. Complex as the mechanism concerned with edema formation and its control may be, it is well established that regulation of sodium in the diet for therapeutic purposes does have merit and will produce relief or, at least, will control further progression of edema.[1-6]

Depending on the type of disorder, the severity of the tendency to retain fluid, patient response, and other factors, diets containing from approximately 200 mg to 2,500 mg of sodium daily are prescribed. For example, an individual with mild congestive failure may be permitted a more liberal sodium intake than one with severe cardiac decompensation. The American Heart Association[7] defines three "levels" of dietary sodium restriction, as indicated in Table 1.

Table 1—"Levels" of Dietary Sodium Restriction Recognized by the American Heart Association

Level	Permissible Intake Na mg/day	NaCl mg/day	NaCl tsp/day
Mild restriction	1,500–3,000	3,700– 7,000	½–1
Moderate restriction	500–1,500	1,200– 3,700	⅙–½
Severe restriction	<500	<1,000	<⅙
Normal consumption	3,000–5,000	7,000–14,000	1–2

Sources of Sodium

Sodium is taken into the body in various ways. The most common and most easily recognizable source is solid foods (primarily animal and high-protein products) and nutritional beverages. Condiments, flavoring adjuncts, preservatives, and numerous other sodium containing, food processing compounds are important in the planning and administration of restricted sodium diets.[5, 7] Frequently, sufficient consideration is not given to the sodium content of natural or treated waters which are used, both as a beverage and in the preparation of foods.[8]

The less apparent sources of sodium actually may supply from 10 to 50 times the amount of sodium that is suggested as the upper limit (200 mg/day) in the severe Kempner rice diet regimen.[2] Cole[8] pointed out that a naturally occurring water with an initial sodium content of 250 mg/l (250 ppm), and with a daily fluid intake of 1 liter, supplies almost twice as much sodium as that prescribed in the Kempner diet for severe cases (1 ppm=1 mg/l when the specific gravity = 1.0). Untreated waters with an equal or higher sodium concentration appear to be rather common.[6, 10]

Cooking in high-sodium water may raise the level of a low-sodium food, even though the water may be wasted during or upon completion of the cooking process. The concentration of sodium and other ions in water that is heated or boiled is increased in proportion to the length of the cooking process. This factor should be considered in the preparation of food and beverages for the patient on a restricted sodium regimen.

Sodium Content of Natural Waters

Sodium can be detected quantitatively to some degree in practically every natural water supply. In general, the amount and character of the mineral matter in ground and surface waters depend on the chemical composition and physical structure of the soil and rocks, the temperature, the duration of contact, and the material already in solution.

Water from igneous (silicaceous) rock formations is usually low in dissolved mineral matter. Water from sedimentary rock formations (such as shale, sandstone, and limestone) may contain considerable mineral material in solution, the amount and kind for any particular soil formation being related largely to depth of occurrence. In general, calcium and magnesium containing waters are the shallower ones, and sodium containing waters are the deeper ones. (This is attributable to an exchange of the dissolved calcium and magnesium in the water for the sodium of ion-exchange minerals (such as glauconite) in the rock formation, which takes place as the water percolates into the ground.) In formations devoid of base exchange materials, or in the limestone formations, both the deep waters and the shallow waters contain, primarily, calcium or magnesium ions and are generally low in sodium.

Waters of some soil formations show a familial likeness to one another in mineral content, but differences do exist due to local conditions. Some waters pass through several soil formations, or are composites of waters from different sources or strata and are not representative of any particular soil formation. Therefore, generalities cannot always be relied upon; it is necessary to consider each water supply (which may be a composite of one or more surface and ground waters, or both) as a separate entity, recognizing the fact that the mineral content of any particular supply may also vary from time to time.

As a basic guide, surface waters obtained from lakes and rivers are generally very low in mineral content. Even where chemical treatment is employed, one could reasonably expect the sodium concentration of nearly all surface waters to be tolerated by the majority of patients on a moderate sodium restriction regimen. Ground waters, on the other hand, and particularly the deeper ones, are likely to be high in calcium or magnesium or sodium, or all. The latter probably represent the domestic water supplies for more than half the population of the United States.

Sodium Content of Treated Waters

Except from an esthetic viewpoint, the municipal waterworks operator is unconcerned with the natural sodium content of the raw material, because its presence, even to such extent as to make the water distinctly unpalatable, is not harmful to the normal consumer. Conventional water treatment processes, such as aeration, chemical coagulation, sedimentation, sand filtration, and disinfection have no significant effect on either decreasing or increasing the sodium-ion concentration of the treated water.

There is a major exception to this; it is the use of cation-exchange materials for softening water. In particular, these materials have gained great popularity in household softeners, primarily because of their relative simplicity and low operating cost. Some households employ a cation-exchange unit to soften the available municipal supply, which may previously have been softened to perhaps 200 ppm of hardness as $CaCO_3$.* Where the excess

* Hardness in water is most commonly expressed as the calcium carbonate equivalent of calcium and magnesium ions, in terms of

lime soda ash form of treatment is employed for softening municipal supplies, the added sodium may be significant.

Chemistry of Ion-Exchange Softening

"Hard" waters are commonly thought of as those which require a large amount of soap to produce suds. Such waters contain certain ingredients, particularly calcium and magnesium salts, which react with soap to form an insoluble curd or precipitate, exemplified by the familiar "bathtub ring." In general, ground waters tend to be hard, and surface waters are soft. The total hardness of water supplies used as sources of drinking water, either with or without softening treatment, ranges from slightly below 10 ppm to about 1,800 ppm as $CaCO_3$.[10]

Water softening by the ordinary cation-exchange process depends on the ability of an exchanger to give up its sodium for the cations in water with which it is brought into contact. When a hard water is processed in a cation-exchange bed all of the hardness producing ions are replaced by sodium. This is analagous to the natural softening action already discussed: that is, one milliequivalent of calcium or magnesium is replaced by two milliequivalents of sodium. Thus, the process, theoretically, is capable of producing waters with "zero hardness," which tend to be very aggressive (corrosive) unless further adjusted. This is most frequently accomplished by mixing with a nonsoftened water in such proportions as may be necessary to produce the desired concentration.

Where municipal softening is practiced the finished water usually is not softened below 85 ppm as $CaCO_3$. Recently, the tendency has been to furnish a harder product, especially in view of the sky-rocketing popularity of synthetic detergents that are capable of the same wetting, dispersing, and emulsifying actions as soap without the formation of curd.

Obviously, then, softening through sodium-cation exchangers adds to the sodium content of treated water. The removal of 217 ppm of hardness as $CaCO_3$, for example, increases the sodium content by 100 ppm. Thus, the daily consumption of two liters of drinking water with this amount of hardness would add 200 mg of sodium to the diet.*

Health Significance

Surface water supplies (natural or treated) are generally rather low in hardness-producing and in sodium ions. Normally then, it would be expected that the reasonable use of the majority of such waters by edematous patients, except possibly those that are on the strictest sodium restriction regimen, would not affect the results of sodium restriction therapy.

Untreated ground waters, however, can have a relatively high sodium content. For example, the untreated municipal ground water supply for a community in Illinois is reported[11] to contain almost 1,200 mg/l sodium, or 3,060 mg/l NaCl (1 ppm Na $\simeq$ 2.54 ppm NaCl). Assuming that 2.0 gm of sodium per day as NaCl is the upper limit prescribed in a particular case, the daily use of 1½ liters of this water for drinking alone would supply approximately twice the permissible limit, without consideration of the additional

grains per gallon or parts per million by weight. (One grain of hardness per gallon = 17.1 ppm as $CaCO_3$.)

* Hydrogen- and anion-exchange processes that do not involve sodium substitution are used to de-ionize water, particularly those intended for a specific industrial purpose. However, these processes have gained little popularity for domestic water softening application, since they are considerably more complex and not nearly so readily adaptable to small-scale, individual installations.

amounts obtained from food and other sources.

As indicative of the nature of the problem Table 2 shows the maximum concentration of sodium permissible in a water supply, on the basis of various amounts of drinking water consumed. This assumes drinking water as the sole source of sodium intake, and should be modified accordingly in considering the additional amounts obtained from foods, seasonings, preservatives, medicines, beverages, and other "hidden" sources, such as those entering in the food cooking, preparation, and serving processes.

Actually, moderate sodium restriction involves a reduction by 75 per cent or more of normal sodium intake from all sources by careful selection of food and elimination from the diet of those foods to which sodium is added during industrial processing. A severe sodium restriction involves a reduction by 90 per cent, or more, of normal sodium intake, and an extremely rigid selection of only those foods which are naturally low in sodium. Regular milk is generally excluded from this diet.

Natural ground water supplies having a concentration of Ca and Mg ions of 750 ppm by weight as $CaCO_3$ equivalent are fairly common in some parts of the United States. After ion-exchange softening processing, such waters, theoretically, would contain about 350 ppm of sodium in addition to the original sodium content.

Obviously, when water is high in both sodium and hardness, zeolite softening intensifies the problem (1 ppm of hardness as $CaCO_3 \simeq 0.46$ ppm Na). One well which is only a partial source of supply for a community in Texas has an initial Na content of 387 ppm and a hardness of 1,250 ppm as $CaCO_3$.[10] If this water were the sole source of supply, and if it were softened by the cation-exchange process, each liter of the effluent would contain approximately $387 + \frac{1,250}{2.17}$ or 960 mg sodium (equivalent to 2.44 gm/l Na as NaCl) Figure 1.

Waters which are similar in character to the above could vitiate the results of dietary sodium restriction and might be seriously detrimental to certain patients with cardiac, renal, or hepatic disease. The graph shown here indicates the relationship between hardness and increased sodium content resulting from Na^+-exchange softening processes. This does not include the initial sodium content of the untreated water

Table 2—Permissible Sodium Concentration in Water Used for Drinking Purposes

Restriction	Permissible Total Intake Prescribed			Maximum Permissible Sodium Concentration of Water in ppm or mg/l of Na^+ on the Basis of Consuming		
	Na^+ mg/day	NaCl gm/day	NaCl tsp/day	1 l/day	1.5 l/day	2.0 l/day
Severe	200	0.5	<⅛	200	133	100
	500	1.3	⅛	500	333	250
Moderate	1,500	3.8	½	1,500	1,000	750
Mild	3,000	7.6	1	3,000	2,000	1,500

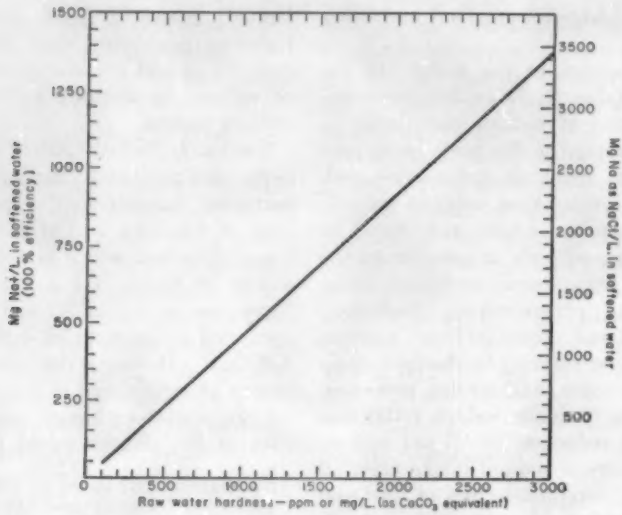

Figure 1—Sodium Replacement in Zeolite Ion-Exchange Water Softening Process

which must be added where significant. The results of chemical analyses for some 1,200 of the larger public water supplies in the United States are available from the U. S. Geological Survey.[10] When one considers that there are, today, in excess of 16,000 public water supplies in the United States, it can be appreciated that available published sources of information cover but a small fraction of the whole.

In addition, it has been estimated that more than 50 million people in this country today are served by individual sources of supply. It is especially important to note that these probably are even more significant to the present problem than the public supplies, inasmuch as individual owners (1) are less likely to be aware of the health implications of the ionic composition of the water, and (2) are not financially or otherwise so able to choose a more select source as a municipality. Treatment facilities for the reduction or elimination of certain objectionable ions, such as Ca^{++} and Mg^{++} are less likely to be employed than for privately or municipally owned public supplies.

On the other hand, housewives are certainly conscious of the economics of soap consumption resulting from "hard" waters, and one frequently encounters the installation of household water softening units, usually of the sodium-cation exchange type.

Summary

With the exception of occasional casual mention, drinking water has been overlooked as a source of sodium sufficiently large to nullify attempts to restrict that element in the rest of the diet. The determination of the Na content of the water supply should be an essential part of the establishment of a restricted sodium regimen. Where the upper NaCl limit prescribed is low, such as the Kempner rice diet for hypertensive patients, even a very low concentration in the water supply may be very significant. In such cases, it is

very likely that a de-ionized or distilled water may be required, for even the usually low-sodium surface supplies may prove objectionable.

Where a more liberal salt diet is prescribed, the probability is that the normal use of most surface supplies will not add significantly to the sodium intake; nevertheless, the situation should be evaluated and judged accordingly. Ground water supplies, however, and particularly the deeper ones, should receive careful scrutiny by the prescribing physician and dietitian, especially if ion-exchange softening units are used.

Each situation must be considered individually. Ion-exchange or excess lime soda softening, even of very hard waters having a high initial saline content, would rarely be in any way physiologically harmful to a person in normal health. Except in those cases where the concentration of Na, as well as of Ca and Mg ions, in the presoftened water is unusually high, the effects of the additional source of sodium are not insurmountable for ambulatory patients on a less intensive sodium restriction regimen, provided that they are aware of the situation, its significance, its effects, and what might be done to overcome it.

Of paramount importance is recognition of the potential problem by the attending physician and the dietitian on the case, in order that the efficacy of otherwise carefully planned diets and conscientious application by the patient may not be contravened. The additional effort involved in analyzing the situation is certainly justified, even though it may be significant and applicable for only a small minority of all cases in which this type of therapy is indicated.

Recognition is significant also from the standpoint of certain complications that occasionally accompany sodium restriction therapy, notably the "sodium depletion" syndrome.[12] To date, relatively few complications have been reported, possibly because the rigidity of sodium restriction frequently is not as great as that prescribed. With increasingly more complete information now at hand for the physician and dietitian pertaining to sources and actual amounts of sodium taken into the body, the degree of sodium restriction may be increased and perhaps more frequent complications will be realized unless otherwise compensated for.

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Endemic Goiter in Ohio School Children

GEORGE J. HAMWI, M.D.; ALBERT W. VAN FOSSEN, M.D.; ROBERT E. WHETSTONE, M.D.; and IZOLA WILLIAMS

How much of a public health problem is goiter in the "goiter belt" states? This revealing study has the great advantage of starting from a solid base line to give an accurate answer to the question. Health people outside the midwest area will want the answer, too.

Physical examinations of men entering the United States military service in World War I revealed a widely varying incidence of simple goiter in men from different geographic areas. This information was combined with the then current data on iodine content of soil and water to determine that a natural goiter belt extends from the Appalachian Mountains westward through Ohio, Michigan, Wisconsin, Minnesota, the Dakotas, Montana, and Oregon.[1] In these states the incidence of goiter was markedly higher than in other areas and the iodine content of soil and water was extremely low.

An original experiment carried out by Marine and Kimball in Akron, Ohio, with 5,000 adolescent girls from 1916 to 1920 established the efficacy of the addition of iodides to the diet as a means of preventing simple goiter.[2] Later surveys and studies made in Ohio and adjoining states demonstrated that adding iodide to the food salt in goitrous areas is a practical method of goiter prevention. Under the auspices of the Ohio Department of Health, Kimball examined school children in several Ohio counties for goiter in 1925.[3] The results of this survey were never published, but total figures for four counties showed an incidence of 40.5 per cent goiter in girls and 24.2 per cent in boys, and an over-all incidence of 32.3 per cent.

A natural experiment involving the use of unrefined salt containing iodine was brought to public attention by a study conducted by Kimball in the Huntington and Charleston area of West Virginia in 1923.[2] Prior to 1900 residents of this area had used an unrefined salt from local salt wells which upon analysis showed an iodine content of approximately 0.01 per cent. During that period goiter had been practically unknown in the district. Soon after that date refined and free flowing salt from other states was introduced; the use of the local product was continued only for livestock. When high school girls were examined in 1923, approximately 60 per cent had visible thyroid enlargement. The publication of this study led to the practice of adding iodides to refined salt.

About 1925 salt producers began marketing food salt containing the recommended amount of potassium iodide. Ohio families were encouraged by many health and educational agencies to begin the regular use of iodized salt, but there was some opposition to its use by a few medical men who believed that it might increase the hazard of hyperthyroidism or exophthalmic goiter. A study in Michigan in 1929 of 1,229 adults with goiters of long standing showed that these fears were groundless,[4] however. Thus the general addition of iodine to the diets of many Ohioans began.

In 1951 the State Medical Society and the State Department of Health in Michigan resurveyed school children in four counties which had been surveyed

in 1923, 1928, and 1935 to determine the incidence of simple goiter. Figures reported by Brush and Altland [5] showed an over-all decline of goiter incidence in this period of from 38.6 per cent to 1.4 per cent.

Purpose of Survey

Since simple goiter is not a reportable disease in Ohio, health and medical authorities concerned with the problem of iodine deficiency and simple goiter could find in 1953 no reliable figures to indicate the present size of the goiter problem in the state. Hence, the Ohio Department of Health and the Department of Medicine of the Ohio State University jointly planned and conducted an examination of over 27,000 school children for the presence of enlarged thyroid gland. The objectives of the survey were: (1) to determine the current incidence of enlarged thyroid gland among Ohio's school children; (2) to determine the progress made since 1925 toward the control of simple goiter; and (3) to determine, if possible, some of the major factors affecting the incidence of simple goiter.

Method

As figures were available from the 1925 goiter survey only for Butler, Marion, Union, and Washington Counties, these were selected for the 1954 survey so that resulting figures could be more easily compared. Another reason for selecting these counties is that they represent three different geographic areas of the state. A representative sample of approximately 30,000 children was selected for examination in the survey areas. The cooperation and interest of local health departments, school administrators, parents, and medical societies were obtained by letter and by personal visits of district nutrition consultants of the State Health Department.

A team of two medical examiners was selected and trained by the Ohio State University College of Medicine. Criteria used for the examination were essentially those used by Kimball and other workers in previous surveys. The child was asked to lift his chin and look upward and the examiner observed the neck for visible thyroid enlargement. If no enlargement was observed the child was not examined further. If there was visible enlargement, the gland was palpated for size, consistency, and the presence of nodules. Thyroid size was graded as either normal, slightly enlarged, or moderately enlarged. All glands which were not visible, or which were visible only on deglutition, were regarded as normal. In addition, any glands which were only slightly enlarged or about which there was some doubt or disagreement between the examiners were called normal. A gland visibly enlarged to from three to six times normal size was recorded as slightly enlarged. If the enlargement was deforming, about eight to 10 times normal size, and visible with head in normal position it was termed moderately enlarged.

Prior to the examination of the children letters were sent to their parents explaining the purpose of the survey and requesting information on the use of iodized salt in the home. Answers of parents were recorded on the individual cards prepared for the children as: (1) regular users, (2) indefinite users, or (3) not at all. Each card also gave the child's name, age, sex, name of county, school, and grade. When the child was examined the examiner checked on the card the state of his thyroid gland. When it became apparent that many parents were uncer-

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tain regarding their usage of iodized salt, nutrition consultants obtained information from wholesale salt dealers and retail grocers on the use of iodized salt in the survey areas.

Results

The number of children examined and the incidence of enlarged thyroid gland found in the 1925 and the 1954 surveys are given in Table 1. The over-all incidence of enlarged thyroid gland declined from 32.3 per cent in 1925 to 4.05 per cent in 1954. Two degrees of enlargement were noted and only one-tenth of 1 per cent of the children had moderately enlarged thyroid gland. All others with enlargements were classified as slightly enlarged. Figure 1 shows the incidence of enlarged thyroid gland by age and sex. Children whose history showed regular usage of iodized salt had an incidence of enlarged thyroid gland of 3.42 per cent; whereas those not using it at all by history had an incidence of 6.06 per cent.

In Washington County a study was made of the dietary habits of 50 survey families whose children had thyroid enlargement, and an equal number of families living in the same neighborhoods whose children had normal thyroid glands. An analysis of the iodized salt usage of these two groups is shown in Figure 2. The usage of seafoods by these two groups of families is shown in Table 2. There was no significant difference in the incidence of goiter among rural children as compared with urban children.

Discussion

The marked decline in the incidence of endemic goiter in Ohio since 1925 has been verified by survey data. That the decline is due to many factors, rather than solely to the use of iodized salt, is shown by the greatly reduced incidence of enlarged thyroid gland among children whose reported usage of iodized salt is nil. Although no record was made in 1925 of the usage of seafood, it is common knowledge that improved methods of food preservation and increased facilities for the proper marketing of frozen seafoods have substantially increased the use of these foods in nearly all of the inland states during the last 10 to 15 years.

Table 1—Comparison of the Incidence of Enlarged Thyroid Gland in Ohio School Children as Shown by Goiter Surveys Made in Four Counties in 1925 and 1954

County	Total Cases Studied	Per cent Goiter Among Boys	Per cent Goiter Among Girls	Per cent Goiter All Children
Butler 1925	10,679	22.0	41.0	31.5
" 1954	12,905	1.8	4.2	3.0
Marion 1925	5,352	28.5	37.8	33.1
" 1954	4,231	2.3	7.2	4.6
Union 1925	1,302	18.0	44.0	31.0
" 1954	1,412	2.8	7.7	5.2
Washington 1925	4,247	28.4	39.2	33.8
" 1954	3,854	2.9	9.3	5.9
Total 1925	21,580	24.2	40.5	32.3
1954	22,402	2.2	5.8	4.0

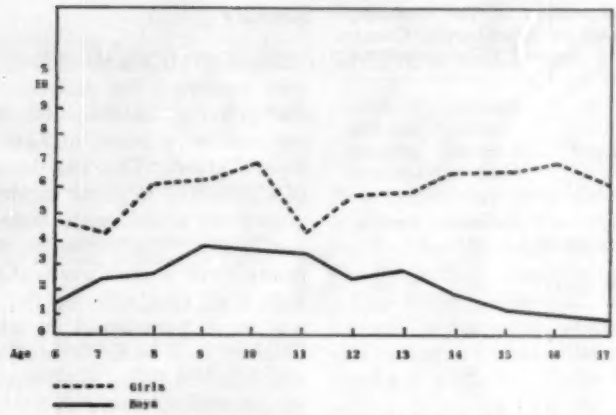

Figure 1—Ohio Goiter Survey—1954, Incidence of Enlarged Thyroid Gland by Age and Sex

Thus it is not surprising to note in Table 2 that a large percentage of families use seafoods once every two weeks or oftener. Because these foods vary considerably from one variety to another in iodine content and children do not always eat well of the seafood group, it is difficult to estimate the amount of iodine obtained from this source. Other possible sources of dietary iodine in Ohio include milk and eggs from animals fed a ration containing iodine and vegetables marketed in Ohio grown in states where the soil contains iodine. It has long been recognized that certain foods of the cabbage family appear to have a goitrogenic effect upon human beings when consumed in relatively large quantities. Little is known of the extent of decrease, if any, in the usage of these foods in Ohio.

Figure 1 shows a substantially higher incidence of goiter in girls over boys at all ages, although the difference is greatest in the ages 14 to 17 years. This difference in the sexes during puberty was noted in the 1925 Ohio survey and is confirmed by data from a survey conducted recently in El Salvador and reported by Cabezas, et al.[6] No satisfactory explanation has been found for the marked difference in goiter incidence in the sexes during the prepubertal years.

If the incidence of enlarged thyroid

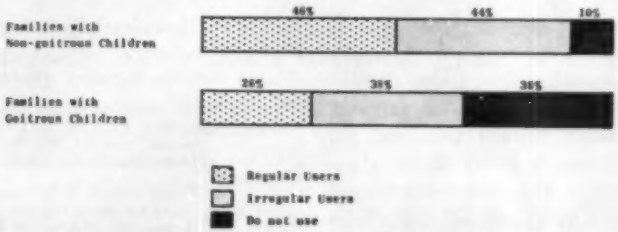

Figure 2—Usage of Iodized Salt, Washington County, Ohio, Survey Families—1954

Table 2—Comparison of the Consumption of Seafood by Washington County, Ohio, Goiter Survey Families—1954

Consumption of Seafood	Families with Goitrous Children	Families with Non-goitrous Children
	Per cent	Per cent
More than once weekly	0	4
Once weekly	16	24
Once every two weeks	38	38
Once monthly	28	16
Once in two months	14	14
Once or twice yearly or not at all	4	4

gland in the 27,547 school children examined can be assumed to be representative of the incidence of simple goiter throughout the state, Ohio has about 80,000 children with thyroid enlargement. If this group is fairly representative of the total population, the state has an estimated total of 320,000 cases of enlarged thyroid gland. A very high percentage of these are not noticeable enlargements and may, therefore, never come under the supervision of a physician. In the younger age groups it is possible that many will disappear with the added dietary iodine that is often obtained from a varied diet. Other cases will not be treated either directly or indirectly and will result in suboptimal health for these individuals.

It is apparent that the problem of endemic goiter in Ohio, although reduced during the past 29 years, is still worthy of the consideration of health and medical authorities. The regular use of iodized salt by all Ohio families would do much toward reducing the incidence of simple goiter to an absolute minimum. This can be achieved only by coordinated educational efforts of health and educational agencies and medical societies.

Summary

More than 27,000 school children were examined for endemic goiter in four counties in Ohio. Of these, 4.05 per cent were found to have enlarged thyroid gland. This was determined to be a reduction in goiter incidence in 29 years from about one in three to about one in 25. The incidence of thyroid enlargement in girls was higher than in boys at all ages, although the difference was more pronounced in adolescence. Children from homes where iodized salt was reported to be used regularly had an incidence of goiter of 3.42 per cent; while those from homes reporting no use of iodized salt had an incidence of 6.06 per cent.

On the basis of survey data it is estimated that 80,000 school children and 320,000 of the total population in Ohio have some degree of thyroid enlargement, although the number of noticeable enlargements is very small. It is obvious that endemic goiter is still a public health problem in Ohio, although a minor one. Educational efforts are needed to promote an increased and more uniform usage of iodized salt and other sources of food iodine.

ACKNOWLEDGMENTS—Appreciation is expressed for the financial assistance given by the Ohio Department of Health and the Institute of Nutrition and Food Technology of the Ohio State University in making this survey possible. The invaluable assistance given by personnel of local health departments and schools of the survey areas is also gratefully acknowledged.

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The Polio Vaccine Assistance Act of 1955

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The newly enacted federal law for purchase of poliomyelitis vaccine will be of current interest to many readers.

The Polio Vaccine Assistance Act of 1955, passed by the last session of the United States Congress in its closing days, and signed by President Eisenhower on August 12, made possible federal grants to the states for the purchase of poliomyelitis vaccine and for the costs of planning and conducting vaccination programs.

It is apparent, as these programs begin, that the public health profession has now the opportunity and obligation to achieve widespread acceptance and use of this new advance in preventive medicine, and with energy and resourcefulness the job can be done successfully to the maximum extent possible within the limits of vaccine production.

We are already benefiting from the amount of close collaboration achieved during the summer among the groups who planned the fall immunization program. The summer's meetings, which saw a real eagerness to cooperate, assembled such groups, or their representatives, as the National Advisory Committee on Poliomyelitis Vaccine, the Association of State and Territorial Health Officers, the American Medical Association, the American Public Health Association, the American Academy of Pediatrics, the American Academy of General Practice, the American Pharmaceutical Association, the National Association of Retail Druggists, the Committee on Polio Vaccine of the Conference of State Governors, and the Department of Health, Education, and Welfare, including the Public Health Service, the Children's Bureau, and the Food and Drug Administration.

The Polio Assistance Act provides $30 million for grants to assist states in vaccinating children under 20 and expectant mothers. Under the act $25 million is provided for the purchase of vaccine and $5 million for the cost of planning and conducting polio immunization programs or for the purchase of vaccine. The funds were allotted to the states according to the number of individuals in the age group noted above and pregnant women, less the number vaccinated in the program of the National Foundation for Infantile Paralysis, the per capita income of the state, and the cost of the vaccine. Funds under this act will be available until February 15, 1956.

Separate and distinct from the act is the voluntary plan for the equitable distribution of polio vaccine, concerned only with the shortage of vaccine as long as it exists. This is the plan for distributing the vaccine which evolved because of mutual agreement by the manufacturers, druggists, physicians, states and the federal government that some form of voluntary allocation was necessary as long as there was a shortage. Under the plan the states have responsibility for the intrastate distribution of the vaccine through both public agency and normal commercial channels.

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The Public Health Service, under this system, makes allocations to the states from each new supply of vaccine according to the number of unvaccinated children in the current priority group. At the federal level, the priority groups are established by the National Advisory Committee on Poliomyelitis Vaccine. The first designated age group was for children five through nine, but the committee proposes to broaden the groups as more vaccine becomes available.

Upon being notified of a new allocation, each state informs the Public Health Service, and in turn the Service advises the manufacturers of the percentage of the allocation the state wishes sold to public agencies and the percentage it wishes moved into the state through normal commercial channels to private physicians.

The manufacturers furnish invoices to the individual states on all vaccine shipped into the state. The Public Health Service receives weekly summaries of the amount of vaccine shipped into each state and pharmacists report weekly in detail to the responsible state officials on all sales of the vaccine. Private physicians were urged by the American Medical Association to make records on vaccinations they perform of the name and age of the individual, the site of injection, and source and lot number of the vaccine.

This method of accounting for the vaccine through all the stages from shipment to utilization should also prevent illegal sales. Further assurance on this is provided through the services of the Food and Drug Administration, which received an appropriation of $300,000 from Congress to prevent poliomyelitis vaccine sales from unauthorized sources.

The whole distribution system that has been described should assure to the maximum extent possible a fair and equitable distribution to all states and persons eligible during the period of shortage.

Ford Foundation Supports Mental Health Research

The Ford Foundation announces a program of support for research in mental health to the extent of approximately $100,000 a year. The research programs may be located in any qualified institution in the United States or abroad. Eligible for support are such programs as personality development; biological, physiological, and somatic aspects of mental health; social and community aspects; children's disorders; and therapy. The first application period closed on September 1. Further information or later applications from Secretary, Ford Foundation, 477 Madison Ave., New York 22, N. Y.

Proposed Report on Field Training of Public Health Personnel

This is a provisional report published at the request of the Committee on Professional Education of the American Public Health Association before transmittal to the Governing Council in order to permit the members and Fellows of the Association to review it and to offer criticism and suggestions. All comments will be carefully weighed by the Committee on Professional Education and accepted changes will be incorporated in the report before presentation to the Governing Council for action. Address comments to Secretary, Committee on Professional Education, American Public Health Association, 1790 Broadway, New York 19, N. Y.

Field training has been defined as an opportunity to study the field application of the principles and practices of public health. There are several types of field training, each of which is designed to serve a distinct purpose. These types can be divided into three categories:

Supervised Field Experience as part of Formal Professional Education (under the supervision of the college or university), including (a) integrated day-to-day experience with the community, and (b) an uninterrupted block of time to provide experience with a community.

Residency Experience of one or more years. Residency training is not considered in this statement and will be the subject of a future report.

Inservice or Continued Education of Various Types (under the supervision of the employing agency) such as: (a) orientation experience, (b) professional development activities, and (c) apprenticeship experience.

Formal Professional Education

The ultimate purpose of professional education in public health is to prepare the individual to work as a member of a team that is able scientifically to diagnose and treat community health needs. Community diagnosis and treatment include evaluation of problems of health status, of health needs, and of past performance. Also included are the prevention of disease; prescription or plan of treatment; obtaining community understanding, cooperation, and participation; rehabilitation; and control procedures. The community as a unit is the patient of public health. The formal education of public health personnel should include closely supervised field experience at the community-side as an integral part of academic education through which the student gains experience working on community health problems. This plan follows the successful educational pattern of other professional groups—medicine, dentistry, nursing, social work, education.

This report, like all other statements of the committee on professional and technical qualifications in public health, is subject to periodic revision in order that it may be kept abreast of the best thought.

This proposed report is a revision of the report on Field Training of Public Health Personnel approved by the Governing Council on October 8, 1947, and is intended to supersede the earlier report.

Objectives of Supervised Field Experience

1. To develop a public health philosophy which encompasses the community approach that deals with the community as an entity—a unit, a patient.

2. To prepare individuals to work as members of a team for the diagnosis and treatment of community health needs.

3. To develop confidence and skills in the analysis and solution of public health problems by participation, under close supervision and guidance, in the application of the principles and practices of public health.

4. To stimulate practical research in the development of new and better methods for the measurement and evaluation of community health needs and status and for the solution of community health problems.

These broad general objectives are applicable to all public health disciplines. It is recognized that each discipline should develop specific objectives that are germane to its function.

Responsibility for Supervised Field Experience

Supervised field experience should become an essential part of the required program for all public health degree and certificate students.

The schools of public health should assume the leadership and responsibility for the entire formal professional educational process both for basic public health principles and for supervised field experience in exactly the same way as other professional schools accept the responsibility for clinical education, practice teaching, or casework practice.

The service agency where the field experience is given must retain the complete administrative responsibility for the operating service program in exactly the same way that hospitals, schools, and social agencies retain their administrative responsibilities when their staffs are used for the equivalent of supervised field experience. This may best be accomplished by an affiliation or contracts between the service agency (local, state, or voluntary) and the school.

The chief responsibilities of schools teaching public health are (a) educational principles, (b) educational content, (c) coordination, (d) approval of programs of supervised field experience, (e) preparation of and assistance in provision of field training instructors, (f) educational supervision of supervised field experience by resident faculty, (g) specific student assignment to area or agency, and (h) initiation of the working agreements.

The schools teaching public health and the service agencies are jointly responsible for (a) selection of the areas or agencies for supervised field experience, (b) procedural activities (manuals, guides, etc.), and (c) evaluation of students and programs.

The responsibilities of the service agencies are (a) provision of facilities, (b) administrative operation, (c) daily supervision of student activities, and (d) maintenance of an "atmosphere" conducive to the learning process.

Elements of Supervised Field Experience

Supervised field experience at the communityside must provide opportunity for the student to make qualitative judgments and quantitative appraisals of the needs of the public health patient—the community—through application of the basic principles of public health and to prescribe and follow through the plan of treatment that forms the programs of the agencies.

There are three steps in this procedure:

1. Evaluation of student needs and background—this must come, first, from the school that has his record of experience and academic activity; second, from the student himself regarding

his assets, limitations, and interests; and third, from the field instructor in the agency who knows the opportunity for experience that can be provided by this community.

2. Introduction—to the agency, its policies, personnel, and problems; to the community—the patient; to the current programs in which the student will participate.

3. Participation—this usually starts with (a) observation, a period of varying length depending upon the situation and the student's background, (b) participation under immediate supervision followed by (c) responsible participation under general supervision and following these three aspects of participation there should be opportunity for (d) evaluation of results and status in regard to the community health needs.

These steps usually occur in the order named but vary in length with each situation and each student background. They may be repeated as participation is broadened to include different programs.

Standards for Supervised Field Experience

The excellence of supervised field experience is determined not by facilities, agencies, or service activities, as much as by the teaching ability of the field instructor. A good learning situation may be developed in agencies or communities with somewhat limited facilities. The time has come to deemphasize the old training center concept where a few model or demonstration centers carried with the whole load of supervised field experience. If all categories and disciplines are to receive supervised field experience, it becomes obvious that a great many agencies will have to participate in the task. Although, ideally and theoretically, one community or one agency might train all disciplines, when provided with qualified field instructors in these disciplines, practically, the job will have to be shared by many selected communities or agencies where there are staffs of good field instructors.

Good field instructors are those with an aptitude for and interest in teaching and the ability to turn a work situation into a learning experience for the students. They should be given due academic recognition by such means as faculty appointments, salary supplements, and educational opportunities. The successful practitioner is not necessarily a good teacher; the successful agency does not necessarily provide a good learning situation if the staff members are not good instructors.

Any agency that is to participate in the supervised field experience must have a well planned program for this aspect of professional public health education, as well as the interest and desire to have students.

Financing of Supervised Field Experience

Supervised field experience was, is, and will be a relatively expensive part of the formal program of education in any profession. In public health the expense for supervised field experience will be materially greater because of the remoteness of the community from the academic center. This increases the cost and time necessary for student travel and maintenance and faculty supervision. Any educational experience of this nature requires a low instructor-to-student ratio which further increases costs. Despite this fact, germane to all health professions, clinical education, or supervised field experience has proved far more economical and efficient than the old system of gaining experience unsupervised by the professional school involved.

The consumer of the product of education in public health is the service agency, local, state, or national. Such agencies must be concerned with help-

ing to finance directly or indirectly supervised field experience costs. This is the case with all other professions that are training students for public service.

Local health administrative units are the largest beneficiaries of the trained product. Training grants by local tax or voluntary funds should be sought and earmarked for this purpose.

Supervised field experience provides many intangible assets to the community and agency that participate, such as:

1. Assignment of the student can stimulate teamwork of the health department or agency staff through the activities necessary in planning, executing, and evaluating the training program.

2. Recognition to the health department or agency in being selected as a training center gives some community and professional prestige.

3. The student gives assistance in providing additional services to the agency staff and in extending the planned health programs of the community, sometimes helping to initiate new activities.

4. The student may contribute new methods, technics, skills, or resources in education which can be shared with the staff.

5. The student's self-appraisal in terms of his training experience can stimulate the agency to evaluate its own programs.

6. The acceptance of a student provides the agency with an opportunity of extending its public relations in the community.

Specific state appropriations to health agencies doing supervised field training should be sought and jealously guarded by state organizations.

Funds, perhaps federal grants-in-aid, should be regularly directed into this channel by the state or should be given directly to the educational institutions in the form of loaned personnel for funds for this purpose. Schools teaching public health should seek support from state and federal legislative bodies to provide for the development of supervised field experience for all students in public health.

Foundations and voluntary agencies should stimulate the further development of supervised field experience in public health as an integral part of professional education. Special reference is made to needs for more research to develop new skills and technics for new and better measurement and indexes for diagnosis and treatment of community needs. Many of the foundations and voluntary agencies are staffed by public health personnel and therefore have an added responsibility to aid with training.

If supervised field experience is to become part and parcel of the formal educational process in public health, more and more of the funds, along with responsibility, must be placed in the schools so that they can carry out their obligation. (No educational process can flourish upon the basis of a supplicant dependent upon the charity of a service institution.) Substantial student tuition and fees for supervised field experience are charged and can help finance this form of education, but will always be a small part of the actual cost of such education.

Inservice or Continued Education of Various Types

We recognize that inservice training should be available to all public health workers regardless of previous preparation. The resources and leadership of the universities, schools of public health, and allied agencies should be utilized in an organized and planned fashion, but all of this inservice and continued education is the responsibility of the em-

ploying agency and needs to be developed, extended, and improved to a much greater extent than is now generally being done. Inservice training should have (a) a large portion of learning-by-doing under close supervision of practitioners of public health, (b) technical training offered to improve the employees' technical knowledge and skills, (c) professional development programs, including professional meetings, conferences, etc.

Inservice training includes:

1. Orientation to the job, to the state and local organization, and to activities of all workers through observation and instruction by the employing agency.

2. Continued education of trained and untrained workers by refresher courses, conferences, workshops, institutes, and professional meetings.

3. Training for those untrained public health workers who for some time will assist with selected aspects of public health work. Short courses, orientation to the job, and apprenticeship under supervision of skilled workers are necessary for these workers.

This committee report relates chiefly to Formal Professional Education and the need to develop and expand supervised field experience as an integral part of the formal professional educational program.

COMMITTEE ON PROFESSIONAL EDUCATION
(as of July 1, 1955)

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The Committee on Professional Education expresses grateful appreciation to the subcommittee which assisted with the preparation of this report. This subcommittee consists of:

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The Air We Breathe—Good or Bad for Us

For thousands of years men have observed and written about the vagaries of the atmosphere. The literature on air pollution is so voluminous that a recent bibliography thereon from the Bureau of Mines (Bulletin 537) covers almost 4,000 references in less than a century and a half. Since writers discussed air pollution as early as 371 B. C., a really comprehensive bibliography would cover many volumes, if not shelves.

Yet in 1955 the U. S. Interdepartmental Committee on Community Air Pollution found it necessary to recommend strong efforts to assay and to correct the disabilities which the presence of substances in the ambient air may have upon the comfort, safety, or health of man, or upon the use and enjoyment of his property. The committee, with representation from the Public Health Service, the Bureau of Mines, the Bureau of Standards, the Weather Bureau, the Agricultural Research Service, the Office of Naval Research, the National Science Foundation, and the Atomic Energy Commission, illustrated in its composition the startling variety and complexity of the substances, natural and man-made, which now enter the atmosphere. Their effects are today inadequately understood, imperfectly controlled, and only intermittently diagnosed.

The deaths and disabilities in the Meuse Valley of Belgium in December, 1930, in Donora, Pa., in October, 1948, in Poza Rica, Mexico, in 1950, in London, England, in December, 1952, and in Los Angeles, Calif., in 1947, 1948, and 1949, are grim reminders of the potential effects of air pollution on man. The natural behavior of the atmosphere, coupled with the accidents of nature, such as Vesuvius and Krakatoa, and the industrial efforts of man have all conspired to force this public health issue upon us.

Congress has accepted this challenge to public responsibility and has enacted legislation this year to come to grips with the problem in an orderly and continuous manner. May the future bring more light on the epidemiology and the control of air pollution!

Fluoridation and Vituperation

In April, 1955, the controlled study of fluoridation of a public water supply in Newburgh, N. Y., completed its tenth year of continuous application of fluorides. This event provided an opportunity for a detailed stocktaking of the effects of this process upon the young and adult population of Newburgh, in comparison with that resident in Kingston, N. Y. The latter city was selected 10 years ago as a control observation center with no provision for fluoridation. The demographic characteristics of the two cities were strikingly similar.

The comparative results of this dramatic long-term epidemiologic study have been elaborated elsewhere, but the salient findings are worth repeating here, for the lessons need emphasis and reemphasis. In brief, they are as follows: (1) Water fluoridation has no demonstrable systemic or developmental effect on children, except for significant reductions in tooth decay. (2) The children examined in Newburgh show normal blood hemoglobin values and urine analyses. Many of the children had been drinking fluoridated waters all their lives. (3) Over a 15-year period the infant mortality in both cities has shown a comparably continuing downward trend. The decline in the stillbirth rate is evident in both cities. (4) The number of decayed, missing, and filled permanent teeth in the children of from six to 10 years of age was 60 per cent lower among the entire Newburgh group of children than among the Kingston children. (5) The decayed, missing, and filled permanent teeth among six- and seven-year-old Newburgh children, who had consumed fluoridated water all their lives, was 75 and 68 per cent lower than those for comparable Kingston children.

Aside from these extremely gratifying public health results, the study represents one of the finest demonstrations of cooperative effort between the citizens and public and private agencies that this country has seen. The foresight and care with which the study was designed and executed, through the wise direction of the state and local forces, are to be commended.

The recent volume on the same subjects issued under the aegis of the American Association for the Advancement of Science pushes forward our knowledge of the fluoridation of water and its effects a very considerable step. All the evidence on all fronts is favorable.

By now nearly 800 communities in the United States serving some 20,000,000 people are using fluoridated public water supplies, again with no evidence whatsoever of anything but valuable and favorable results.

In the face of these mounting orderly and carefully evaluated undertakings, how does one account for the electrically charged attacks on this public health effort in the city councils, the courts, the churches, and the public forums? The settlement of scientific issues by vituperation, in legislative debate, and in the courtroom is not a new phenomenon. The uses of alum and chlorine in water treatment went through the same baptisms of fire half a century ago. Logic, common sense, and overwhelming scientific evidence won the day—with immeasurable ultimate values to man. To fight for an idea may be repugnant, but it is certainly not novel! Nor is it novel for accredited scientists to mix fact and fancy, near truth with truth, and emotion in a brew calculated to confuse rather than to clarify the minds of the public. In the battle for and against fluoridation, the best and the worst of scientific debate are exemplified.

Professional Certification of Sanitary Engineers

✠ For several years a diligent group of sanitary engineers have been exploring ways and means of raising the general level of sanitary engineering practice and, in turn, giving due public recognition to persons qualified by education, training and experience to function in such a field. The pattern to which the group looked for guidance was that successfully pursued by pediatricians, surgeons, internists and in recent years by preventive medical officers.

Since so many voluntary and official agencies were interested in both exploration and decision, the Joint Committee for the Advancement of Sanitary Engineering under the able and wise chairmanship of Earnest Boyce, was asked to wrestle with the proposal. Boyce steered the studies and negotiations through hazardous and rocky channels toward unanimous agreement on a certification procedure—and later toward official acceptance of the plan by the various interested societies.

The American Society of Civil Engineers has agreed formally to lend $7,500 to initiate the board activities, to make space available and, with extreme graciousness, to provide some furniture. This generous step has now been recognized and the certification plan approved by the American Public Health Association, the American Water Works Association, the Federation of Sewage and Industrial Wastes Associations and the American Society for Engineering Education, all of which have representation on the Joint Committee.

Since this step represents the first certification of any engineering specialty—and the one chosen is so significant in public health and preventive medicine—its accomplishment deserves recognition and mention! The headaches accompanying the efforts may be healed long before the fine results anticipated by so many have materialized.

National Science Foundation to Study HEW Support of Research

The National Science Foundation has appointed a committee to study and appraise financial support of medical research by the U. S. Department of Health, Education, and Welfare. The survey will cover the National Institutes of Health which has an annual research outlay of $100,000,000, as well as the research grant programs of the Bureau of State Services, the Children's Bureau, and the Office of Vocational Rehabilitation.

Among the matters to be studied are the rate of growth of research both in federal agencies and in those receiving federal aid, the proper balance between fundamental and applied research, and the relative distribution among major special fields.

NSF was asked to appoint the committee by former HEW Secretary, Oveta Culp Hobby, a request endorsed by her successor, Marion B. Folsom. The eight members are made up of university or medical school professors and Ernest W. Goodpasture, M.D., of the Armed Forces Institute of Pathology. Joseph W. Pisani, M.D., is on leave from the State University College of Medicine, New York City, to serve as executive secretary.

Credit Lines

The Journal cannot furnish copies of items mentioned in Credit Lines. Please send requests to the addresses given.

Combating Arthritis in Canada

The progress being made in combating the crippling effects of rheumatoid arthritis among our neighbors to the north and some of the administrative technics used to achieve this progress are dramatically highlighted in the 1954 Annual Report of the Canadian Arthritis and Rheumatism Society. "The Woman Next Door," a brief and modestly produced brochure, tells the story of the society's services and accomplishments in terms of the situation of a 27-year-old housewife who had become completely immobilized by rheumatoid arthritis.

In constant pain, and with even her jaws so rigid that "only the flat blade of a table knife could be inserted between her teeth," this patient had little hope of resuming normal existence. A consultation with a specialist in one of the society's arthritis clinics affiliated with outpatient departments of general hospitals was arranged and a plan made for home treatment that soon enabled the patient to resume her role as mother and housewife. This result was accomplished through teamwork by a social worker and physiotherapist from the society, the patient's family doctor, and the clinic specialist, and with the assistance of one of the society's 65 mobile physiotherapy units. Work simplification technics and temporary foster care for the patient's children were other services contributing to the rehabilitation of this mother. The society provided services for nearly 6,000 patients last year.

The Canadian Arthritis and Rheumatism Society, 600 Jarvis Street, Toronto 5, Ontario.

A Regional Health Study

"Health Resources in the Northern Great Plains" represents another of the numerous examples of regional cooperation in health and other matters in various sections of the country. It is the work of a Health Committee of the Northern Great Plains Council. The purpose of this committee, in existence since 1939, is "to give leadership and encouragement to programs and ideas for the improvement of rural health in the Great Plains."

The study was carried on by a 23-member committee representing the various skills in the Agricultural Extension Services, farm organizations, universities, hospitals and medical care plans in the area, medical societies, and regional Public Health Service personnel. The report was published in April, 1954. It includes detailed data on the various health services—number of physicians, dentists, hospital beds, extent and distribution of services of voluntary agencies and of state and local health departments. Among its conclusions is that, "Organization of health resources needs to be adapted to local geographic, economic, and social realities. In the Northern Great Plains these vary greatly, from state to state and even within a given state. Statewide organizations as well as local agencies need to concern themselves with contriving the most realistic health service arrangements for various sections of a state. . . . Just as solutions of health service problems are beyond the control of individual families, so they are often beyond the means of the lone rural community. In sparsely populated sections especially we need to 'study

larger maps,' with a view to practical cooperation between communities within economic service areas."

The Great Plains Agricultural Council is made up of the directors of Agricultural Extension Services and the directors of the Agricultural Experiment Stations of the 10 states in the region, as well as of representatives of the U. S. Department of Agriculture agencies directly concerned with those states. The study deals with six of these — Kansas, Montana, Nebraska, North Dakota, South Dakota, and Wyoming.

The report was published by the Agricultural Experiment Station, University of Nebraska College of Agriculture, Lincoln, from whom it is available. W. H. Brokaw, is the executive secretary of the Great Plains Council.

Separate reports for the six states have been or are being developed. North Dakota's Community Health Situation is known to be available. E. J. Haselrud, Director of Extension, North Dakota Agricultural College, Fargo.

A Wisconsin News Letter

In May the Wisconsin State Board of Health through the Division of Local Health Administration began the publication of a News Letter "at fairly frequent intervals." Its primary purpose is "to keep you informed of legislation in which we believe you have an interest." The audience at the outset is health departments serving a population of 25,000 or more and the state district health offices.

But in its several issues the News Letter has ranged more widely among subjects and probably also audiences. It has described the Wisconsin Public Health Council, the meeting of the State Public Health Association, the Health Careers Guidebook, some new health films, and the recent annual meeting of the National Tuberculosis Association in Milwaukee.

The News Letter is mimeographed and has none of the eye-catching "gimmicks" often considered indispensable in communication. Nevertheless, it is readable and the information itself is important. It is a good supplement to the printed Quarterly Bulletin of the board.

From Basements to Health Centers

An analysis recently made by Andrew Hedmeg, M.D., director of local health services in the State Department of Health, indicates that in Louisiana 57 new health centers have been completed or in a few instances contracted for in 43 parishes, at a cost of more than four and a quarter million dollars. These were built under the terms of the Hill-Burton Construction Act. The local community and the state provided 54 per cent of the funds, representing a per capita expenditure for this purpose alone of about 87 cents.

If this development is typical of other states as well, it is a dramatic illustration of the extent to which health departments are coming out of basements and other unacceptable quarters into suitable, healthful surroundings. A few years ago it would have seemed incredible that an investment of four million dollars in facilities of this kind could be made in one state alone.

Social Changes and Mortality

Behind the weighty title of a recent analysis of age-specific mortality is an exciting item for public health workers —a suggestion for a detailed study of the impact of social change on the factors causing human mortality. The author is Odin W. Anderson. He presents a valuable reminder of both the limitations and potentialities of medical

knowledge and its applications. Age-Specific Mortality in Selected Western European Countries with Particular Emphasis on the Nineteenth Century—Observations and Implications, Bulletin of the History of Medicine, XXIX:239–254 (May–June), 1955.

A Massachusetts First

The first handbook to assist local health officials carry out their part in the elimination of substandard housing was recently published by the Massachusetts Department of Public Health. "Housing Rehabilitation" summarizes the general laws of the Commonwealth which apply to the regulation of housing and answers basic questions about their administration; discusses administrative methods for improvement of substandard housing; outlines a plan for community rehabilitation programs; and includes a check list of appraisal items to be used in housing inspections. Housing Rehabilitation: An Administrative Guide for Community Action. Division of Sanitary Engineering Massachusetts Department of Public Health, October, 1954. No charge.

Social Workers Study Cerebral Palsy

"Cerebral Palsy—A Social Problem" is a 47-page pamphlet summarizing a symposium of 200 professional persons representing 40 different social, educational, and medical agencies. The papers and discussion were on the problems of the child with cerebral palsy and his family; the dilemma of the adolescent, and the needs of the adult. Among the conclusions were the general recognition of the fact that there are definite limits to the usefulness of casework services unless certain additional community services can be established, and these and the existing services utilized and coordinated more fully on behalf of the palsied.

United Cerebral Palsy of New York City, Inc., 47 West 57th Street.

Measuring a Small Child's Hearing

"Too Young to Say" is the title of a 16 mm color movie. It shows how a child too young to understand can be taught to cooperate in a hearing test. The film is based on a game devised by the John Tracy Clinic in Los Angeles, the net effect of which is to tell the operator when the child is hearing "beeps" through an audiometer. The 13½-minute movie, available for medical, professional, educational, and lay groups was produced by the University of Southern California through a grant from the Beltone Hearing Aid Company, 2900 W. 36th St., Chicago, through which prints are available for showing without charge.

All About Canadian Physicians

A preliminary memorandum by the Canadian Department of National Health and Welfare reports the number, sex, age distribution, location, and specialty of physicians in active practice in Canada as found in a 1954 mail questionnaire.

The pattern developed is roughly similar to that of the United States: more than half of the physicians were over 45 years of age; the population per physician is under a thousand (Canada: 950:1; United States: 880:1). However the ratio of doctors in military service to those in active practice is more than twice as great in the United States (59 per 1,000 vs 24 per 1,000 in Canada). Almost three-quarters of Canadian physicians are in population centers of 10,000 or more; in recent years there has been a decided drop in each of the provinces in the proportion engaged in general private practice.

It is to be hoped that all of the data gathered will be published in the final study, particularly in tables specifying

rural-urban distributions by years of practice and population per physician.

Survey of Physicians in Canada, June 1954. Research Division, Department of National Health and Welfare, Gnl. Ser. Memo. No. 2, 6th ed., Ottawa.

Cutting Second Injury Risks

A useful job—the desired goal of vocation rehabilitation—has often been blocked by the employer's fear of liability for further injury to a "handicapped" worker. Second Injury Funds now exist in 46 of our 52 states and territories to help protect such a worker's economic security and to minimize the financial risk to the employer and insurance carrier. Knowledge of the existence and nature of these funds will help break down employer resistance to jobs for handicapped workers. A summary of the provisions in Second Injury Funds under Workmen's Compensation as of December, 1954, has recently been released in mimeographed form by the Bureau of Labor Standards, U. S. Department of Labor, Washington, D. C.

"So Much for So Little"

"A Life for Ten Cents" is the contribution of the Atlantic Monthly to an understanding of how much can be done with how little money by UNICEF or other UN Agencies. This is the story of yaws, trachoma, malaria, and tuberculosis in Asia. It is told by S. M. Keeny, director of UNICEF for the Asia Region. "And what do the contributing countries, of which the United States is first, get for what they give? First of all, the knowledge that the risk of these contagious or infectious diseases spreading to other countries is declining rapidly. Second, that the ground is being cleared not only for better health programs reaching into the hundreds of thousands of villages of Asia, but also for a gradual escape from the vicious circle of poverty and sickness. Finally, a growing measure of good will that is often grossly underestimated because it does not often appear in a formal letter of thanks. But the thanks are there, as anyone who has visited a village after it has been cleared of yaws or malaria will testify. It may be a plate of rice or of bananas or mangoes—or the cool water from a green coconut just brought down from the tree by a village boy."

The Atlantic Monthly is to be congratulated for thus dramatizing some of the programs in which the United States has a large share. The article appeared in the June, 1955, issue and has been reprinted. Atlantic Monthly Company, Boston 16, Mass.

Faith with Works

Church World Service, a unit of the National Council of Churches has presented a mobile tuberculosis x-ray unit to Korea. Specially designed, it carries its own gasoline-driven electrical generator. The unit reportedly represents the first such x-ray equipment available in Korea where tuberculosis is a leading cause of death.

The National Council of Churches is made up of some thirty American Protestant groups.

Prefer Fluoridation Wreaths

Franklin M. Erlenbach, D.M.D., chief of the Division of Dental Hygiene, Connecticut's State Health Department, suggests that an event in New Canaan is "worthy of the widest publicity." The weekly paper of that town recently carried a front page box in which the parents of a small boy killed in an automobile accident asked that flowers be omitted and the money donated instead to the Memorial Fund for Fluoridation. Because lack of knowledge and misin-

formation are blocking a fluoridation program in the town, the father asks his neighbors as the "best tribute to the memory of his son" to assure the success of the efforts to fluoridate the town's water supply and "thus contribute to the welfare of other New Canaan children."

Self-Study of Hearing Programs

"Guide for Self-Study of Hearing Programs" is a 52-page mimeographed guide to encourage and assist local chapters of the American Hearing Association evaluate and improve their programs. The six sections are devoted to unmet needs and available facilities in the community; the staffing, budgeting, organization, and community relations of the programs of the various local chapters. Each section includes a brief preliminary statement on guiding principles and a suggested fact-finding form. Philosophy and objectives are stressed by a series of multiple choice questions that bring out varying opinions and statements of belief regarding the philosophy and objectives envisaged by the local chapter personnel thus allowing for comparison and perhaps modification if desirable. This may be of use to both voluntary and official agencies in evaluating their programs for hearing impairments.

American Hearing Society, 817 14th Street, N.W., Washington 5, D. C.

Assurance of a Fuller Life Series

The Equitable Life Assurance Society has initiated its series of booklets designed to help gain "assurance of a fuller life" with "vacationing." Pocket size, it is well printed, attractively illustrated, and written in simple, friendly language. It has practically everything one needs to know about vacation—how to plan (for different members of the family), how to travel, what to take along, how to close up the house, how to get a suntan, swim, or exercise safely, and even how to sterilize the baby's bottle.

The booklet and accompanying posters are prepared by the Medical Department, whose director is Norvin Kiefer, M.D., Equitable Life Assurance Society of the United States, 393 Seventh Ave., New York 1. They are available free of charge.

It Isn't Always Heart Disease

"Pump Trouble" is a new 16 mm color sound film that deals with the various fables about heart disease. Mr. Pump, who as a child was always on the sidelines because his mother was sure he had heart trouble, resigned his job after a "heart attack." But his doctor found he had only "indigestion magnified by anxiety and misinformation," and sends him back to his job to "live normally and stop worrying." With humor and imagination it emphasizes that only a doctor can diagnose heart disease and that the "jitters" aren't necessarily heart disease.

The film runs 13½ minutes and is accompanied by a discussion guide. The film may be either bought or rented. American Heart Association, 44 East 23rd St., New York 10.

"The Invader"—A New Approach

A new movie on syphilis, "The Invader," a 40-minute documentary, was previewed in June under the joint auspices of the American Social Hygiene Association, American Venereal Disease Association, and the Association of State and Territorial Health Officers. This movie traces 400 years of man's efforts to deal with this disease and its surrounding problems. It shows the step-by-step development of medical knowledge and the changes in public attitude toward the disease.

The film uses documents of each century, starting with woodcuts and engravings from the Renaissance and ending with motion picture records of the work of modern pioneers like Drs. Alexander Fleming, Howard Florey, Thomas Parran, and John Mahoney. It tells much of this story through the observing eye of such artists as Dürer, Breughel, Hogarth, and Daumier. The history is dramatically portrayed—the discovery of the spirochete in 1905, the Wassermann test in 1907, the magic bullet 606 compound in 1909, the campaign of public information in 1936, and finally the discovery of the rapid cure in 1943.

E. Gurney Clark, M.D., professor of epidemiology, Columbia University School of Public Health, served as medical consultant for the film. The amount of syphilis found among teenagers during the past year was a "shocking surprise" to parents and educators, he pointed out. The new film is designed particularly to meet the problem of sex delinquency in the teenage group.

The film was produced by the Columbia Center for Mass Communication for the Georgia State Department of Public Health. Free prints for state health departments were guaranteed in production contracts for "The Invader." It is anticipated that venereal disease control officers and health educators will make the prints available to community groups working with the teenagers.

A pamphlet for school and community use in connection with showings of "The Invader" has been produced by the Public Affairs Committee, 22 East 38th Street, New York City. Designed as a discussion guide or teaching aid, the 30-page pamphlet emphasizes that the fight against syphilis "is by no means won."

Annual Reports

"Rx for Health" is the 1953–1954 Annual Report of the Arizona State Department of Health. It is a simple, department-by-department report, but well personalized and specific as to what was done. An interesting chart shows Arizona's infant death rate, tuberculosis case and death rates, the venereal disease case rate, and per capita state appropriation for health services in relation to the same data for seven other neighboring states. Arizona has the highest mortality and case rates and the lowest per capita state appropriation.

With respect to tuberculosis, the director of the state control program, Albert E. Russell, M.D., cites "the indifferent attitude of the people toward the facilities that are available," along with insufficient funds as the reason for an inadequate control program.

1954 Annual Report, American Cancer Society, not only reports on 1954 but is a calendar of 10-year progress. In 1945 the society was reorganized and its activities broadened and intensified, particularly in the direction of wider public education and involvement. That year saw contributions to the national and its chartered societies exceed a million dollars for the first time; by 1954 contributions exceeded 21 million of which over 5 million, more than the total 1945 contribution, was allocated to research.

The society concerns itself with three aspects of cancer control—research, education, both public and professional, and service for patients. Its annual report is a valuable summary of the current situation in the cancer control movement of value to libraries, medical schools, research scientists and institutions, foundations, and science writers. American Cancer Society, 521 West 57th St., New York 19, N. Y.

Books and Reports

All reviews are prepared on invitation. Unsolicited reviews cannot be accepted.

Pomp and Pestilence: Infectious Disease, Its Origins and Conquest—By Ronald Hare. New York: Philosophical Library (15 East 40th St.), 1955. 224 pp. Price, $5.75.

In this small book, Dr. Hare, professor of bacteriology at the University of London, tells the story of parasitic infections in man, with special attention to the major communicable diseases such as plague, cholera, dysentery, influenza, and typhus fever. He begins his account with a discussion of parasitism in its various forms (symbiosis, commensalism, and pathogenetic coexistence), and then considers its development in prehistoric man. The author then turns his attention to the spread of communicable diseases throughout the world during the historical period, and deals with the pandemics and epidemics of plague, cholera, typhus, and smallpox. Ideas held concerning the nature of infectious diseases, and the ways in which many of the infections have been overcome by community or individual effort are traced. Finally, he discusses the social impact of the modern attack on epidemic disease, with particular reference to population growth and food supply. In general, the author ends on a pessimistic note, especially as concerns the Orient. In his opinion, control of communicable disease will increase life expectancy and population will increase. At the same time, he feels that this will impose "an almost intolerable strain on the food supplies of the world." Whether this bleak outlook is justified may be doubted, since the resurgent nations of the East, e.g., India and Burma, have recognized the problems and have undertaken to deal with them. All in all, however, the author has written a popular book which is highly readable and is recommended to anyone interested in the history of human disease.

GEORGE ROSEN

A Manual for Training the Disabled Homemaker—By Howard A. Rusk, et al. Rehabilitation Monograph VIII. New York: Institute of Physical Medicine and Rehabilitation, New York University-Bellevue Medical Center (400 East 34th St.), 1955. 167 pp. Price, $2.00.

The purpose of this manual is to provide information for agencies, groups and disciplines who have been interested in the problem of rehabilitation of the disabled homemaker in skills necessary to her role. The reviewer feels that this has been achieved.

Organization of this service is discussed either as a community program or that of an institution. The success of either service is suggested as dependent on two essential persons, a physician who is the source of referral and support, and a teacher in home economics with experience in home management and work simplification. This is sound philosophy.

Different types of patients are discussed with a brief, but sufficient, description of their physical limitations to help the worker understand the patient and her problems. Work simplification is defined as "organized use of common sense to find easy ways of doing work." This is actually what this pamphlet does. Patients with the following diagnoses are considered: cardiovascular diseases, pulmonary tuberculosis, arthritis, hemiplegia, any neurological disability, and the aged.

Household tasks of cleaning, meal

planning, preparation and clean-up, and laundry are analyzed to suggest means to avoid bending, unnecessary walking, lifting, and reaching and climbing. It is actually preventive therapy for any housewife. Household tasks are broken down to meet the needs of a homemaker with hand difficulties, such as in cooking, the art of peeling, slicing, dicing, grating, or opening an egg with one hand. Likewise, they are adjusted to the requirements of those who have lower extremity disabilities.

To aid both the teacher and the learner, there are 107 illustrations, visual helps which are essentials to reinforce the printed word. At the end of the book, there is practical information for purchasing much of the equipment displayed and discussed.

ELIZABETH C. HITCHCOCK

Diseases Transmitted from Animals to Man—By Thomas G. Hull (4th ed.). Springfield, Ill.: Thomas (301–327 E. Lawrence Ave.), 1955. 717 pp. Price, $12.50.

This is the fourth edition of the book which first appeared 25 years ago and has been long awaited because of the increased interest in the zoonoses. It is regrettable that preparation of this edition took so long, inasmuch as some chapters were out of date by the time it appeared in early 1955. An example of dated information is the chapter on rabies. This chapter fails to point out important recent advances in diagnosis, canine vaccination, local wound treatment, and the use of hyperimmune antiserum in postexposure treatment. Too much emphasis is placed on the use of muzzling as a rabies control measure, a practice which has long been shown an impractical and ineffective procedure.

The book is divided into three sections. The first section discusses the more important of the zoonoses. Among those included are tuberculosis, anthrax, brucellosis, Salmonella infections, rabies, psittacosis, the encephalitides, parasitic and fungal diseases. In addition, there are interesting chapters on such exotic diseases as vibriosis, glanders, animal erysipelas, listeriosis, vesicular and pox diseases, Newcastle disease, cat scratch fever, and Rift Valley fever.

Section II reviews the diseases which have rodents and wild animals as their principal hosts, although domestic animals are occasionally found infected or diseased. Some of the more important public health problems from a world point of view are emphasized under this heading. Plague, typhus fever, spotted fever, and jungle yellow fever are the main problems of this group. It is interesting to note that the author placed Q fever in this section. Attempts to catalogue diseases are most difficult and with the increasing knowledge of sylvatic and campestral reservoirs of disease the division attempted by the author will be nearly impossible.

The third section, the relation of human and animal diseases, is an area about which a book could be written. It is a succinct review of the problems that the public health, medical, or veterinary officer may refer to frequently for information. It will not always answer his question, but will provide him with leads to be followed if he is interested.

The greatest value of this book will be to the young medical and veterinary public health officer who is cognizant of many of the problems discussed in the book, but who lacks experience with many of these diseases. Teachers of preventive medicine and public health in medical and veterinary schools will also find the new edition of value. Lastly, the practicing physicians and veterinarians who are responsible for the early diagnosis of these diseases in man and animals will find this book a good reference. Civil defense officials and medical scientists who have civil defense responsibilities will likewise find this book

interesting reading. In fact, they should make it required reading for all medical officers who are concerned with the possible introduction of exotic or rare diseases. JAMES H. STEELE

Twenty Years of Nurse-Midwifery—New York: Maternity Health Center (48 E. 92nd St.), 1955. 124 pp. Price, $2.00.

It is probable that most of those reading this review were not delivered by physicians in hospitals. It is only within the past 30 or 40 years that there has been such a substantial trend toward hospital deliveries by physicians, and this is especially marked in the United States. In many countries a much larger percentage of deliveries occur in the home, frequently attended by midwives and with results that are comparable in maternal and infant mortality rates with those in the United States.

Has the pendulum swung too far? Have we sacrificed emotional security, family unity, and the naturalness of childbirth to the antiseptic safety of specialized medical deliveries on a semi-assembly line hospital basis? Can nurses educated in midwifery, working under capable medical supervision, provide safe and satisfying care during pregnancy, deliver women in the home or hospital, and provide adequate care during the puerperium? These are some of the questions asked by the Maternity Center Association and discussed in their recently published report on their first 20 years.

This voluntary agency in New York City has graduated 231 nurses, many with baccalaureate or masters' degrees, from a six-months' course in nurse-midwifery during the past 20 years. Under careful and competent medical supervision they have delivered 3,376 infants, 83 per cent of which were delivered in the patient's home. Their results show a lower maternity and infant mortality rate than the patient's neighbors who were routinely delivered in hospitals by physicians.

In addition, many of the nurses so trained have provided obstetrical leadership in the nursing profession and have made notable contributions to safe maternity care in nearly all of the states and territories of the United States and in 30 foreign countries.

This report is well worth reading by those interested in maternal and child health. EDWARD PRESS

The Health Visitor and Tuberculosis—By Sheena H. Buchanan. London: The National Association for the Prevention of Tuberculosis, Tavistock House North (Tavistock Square), 1955. 150 pp. Price, $2.00.

The health visitor in England is comparable to the public health nurse in the United States. This compact, readable little book is packed with facts and information relating to all aspects of the tuberculosis control program in England and the part taken in it by the health visitor.

In presenting her material, the author uses a personal approach, interspersing her facts with interesting anecdotes gleaned from her many years of experience as a health visitor.

Among the subjects covered, she includes a vivid description of the health visitor herself—her qualifications, training, nursing practices, attitudes, and philosophy. It is of great interest to us in public health nursing in the United States to note the similarities in these areas, as well as the minor differences which exist between them and the English health visitors. Perhaps the greatest difference is found in the terminology and phraseology, much of it provocative and worthy of further thought. Among these are: "recuperative holidays," "sick nursing," and "mental ill health."

The author shows a thorough understanding of the tuberculosis problem and

measures in which the health visitor functions in its control. Her pride in her profession radiates throughout this work. It is a book well worth the reader's time.

HELEN HORKAVI SATRAN

Psittacosis—Diagnosis, Epidemiology, and Control—Edited by F. R. Beaudette. New Brunswick, N. J.: Rutgers University Press, 1955. 240 pp. Price, $5.00.

This publication is not a complete and organized treatise of the material suggested by the title; rather, it is the proceedings of a symposium held in May, 1953. On the negative side, it suffers from the unevenness inherent in a multiplicity of contributors. Also, the discussions should have been printed following each paper rather than in a single section at the back of the book. Many interesting facts and ideas are essentially buried out of context in this section.

On the positive side, much information bearing on the diagnosis, epidemiology, and control of psittacosis is gathered into a very readable volume of modest size. There is a brief, interesting historical account, a good general survey of the ecologic and microbiologic aspects, a short presentation of the status of specific diagnosis, a chapter on United States foreign quarantine regulations, and a review of chemotherapy, including both experimental and clinical data. But above all, there are numerous firsthand accounts of specific episodes of human disease, such as the bayou pneumonitis of Louisiana and the recent outbreaks of psittacosis in turkey dressing plants in Texas and of investigations of the extent of infection with psittacosis-like viruses in various avian species. One is impressed with the estimated frequency of infection in such species as pigeons and ducks, as well as in parakeets, but is correspondingly amazed at the infrequency with which such a ubiquitous group of agents finds its way over to man. Yet, under special conditions, still to be fully defined, serious human disease may occur.

The book should serve as a useful reference for health officers, epidemiologists, and practicing physicians.

JOHN P. FOX

Studies in Tuberculosis—By R. G. Ferguson. Toronto, Canada: University of Toronto Press, 1955. 124 pp. Price, $3.50.

This volume by Dr. Ferguson, former director of medical services and general superintendent, Saskatchewan Anti-Tuberculosis League, is a must book for students of tuberculosis, of medicine, and of public health who remain students while they work.

The author has spent his lifetime studying and putting into general practice the fundamentals of tuberculosis control which he has learned from experience. In this book he describes in detail the epidemiologic factors in tuberculosis, going into the problems of racial and familial susceptibility, physiologic factors, age and fatality, effect of population movement on a tuberculosis epidemic, and the elimination of susceptibles in the attainment of resistance to the disease.

Dr. Ferguson has had a virgin territory for his studies. Virgin territories are not as prevalent today as they were a generation ago; however, the basic knowledge that he has acquired from his studies can be applied to areas of high infection in the general population in the United States and throughout the world.

Part three deals with the source of tuberculosis epidemics and part four with the foundations of a preventive program.

Dr. Ferguson has had a great deal of experience with BCG vaccination. He finds BCG efficacious to a relatively high

degree, but where tuberculosis is already a lesser problem he reserves its use for the unavoidably exposed.

In this day and age when tuberculosis is taken lightly because of the great reduction in the death rate and the advancement of chemotherapy, this book should be required reading for every student in public health, including public health nurses and all those dealing specifically with tuberculosis. This extremely intimate lifelong study with its thoroughness gives the necessary basic knowledge in which one can understand the role of mass studies and statistics in such a medical program. It cannot be read as easily as some books on the same subject, but must be thoroughly studied if one is to get any value out of the material because the author has understood the total problem of tuberculosis. It is really worth the time to read it and understand it well because one cannot read this book without getting a deeper insight into the seemingly endless battle against the disease. E. A. PISZCZEK

Industrial Ventilation. A Manual of Recommended Practice (3rd ed.). By the Committee on Industrial Ventilation, American Conference of Governmental Industrial Hygienists, Lansing Mich. (P. O. Box 453), 1954. Price, $3.00.

This manual on industrial ventilation was developed to provide in a single source current data on industrial exhaust ventilation in the control of atmospheric contaminants in industry.

The manual is composed of 11 sections, including chapters on: General Principles of Ventilation, Dilution Ventilation, Comfort Ventilation, Hood Design, Specific Operations, Dust Design, Make-Up and Recirculated Air, Construction Specifications, Testing of Ventilation Systems, Fans, and Air Cleaning Devices. Definitions, appendixes of supplemental data and a bibliography are also included.

In addition to presenting data on exhaust ventilation, the manual serves to promote standardization in ventilation practices and for the training of engineers in the ventilation phase of industrial hygiene engineering.

The manual should be included in the essential list of reference books for industrial hygiene engineers, plant engineers, ventilation contractors, and others having a responsibility in the control of atmospheric contaminants in industry and in the comfort of workers.

LEWIS J. CRALLEY

General State Food and Drug Laws —Annotated—By David H. Vernon and Franklin M. Depew. Chicago: Commerce Clearing House (214 N. Michigan Ave.), 1955. 804 pp. Price, $17.50.

This seventh of a series of books of the Food Law Institute compiles and annotates state general food and drug laws brought up to date as far as this can be done, considering the enthusiastic activities of law makers constantly grinding out additional legislation. No attempts have been made by the authors to include the immense number of laws concerning specific foods or subjects or regulations of specific boards of the states and territories.

The basic food and drug laws prohibiting adulteration, misbranding and (as may be) false advertising for each state and territory, with date of enactment, chapter and section number of each of the legislative acts are given. Reported cases are summarized.

Two indexes are appended, one headed, "Table of Cases," the other by subjects subdivided into states and territories. A foreword by Charles Wesley Dunn and an introduction by the authors are enlightening in that a brief history of this type of legislation and the attempts to unify state food and drug legislation with existing federal acts are given.

This reference book should be on every health officer's and food control official's bookshelf. It is valuable as a guide in the preparation of new laws (and in a few instances how not to word a law); it is useful in ascertaining the enforcement agency in the state; and as a quick reference to the extent of food and drug legislation of the various states.

The print is clear and easily readable and the binding attractive.

FERDINAND A. KORFF

Sickness Experience in Selected Areas of the United States—By Selwyn D. Collins, Katharine S. Trantham, and Josephine L. Lehmann. Public Health Monograph No. 25. Washington, D. C.: U. S. Gov. Ptg. Office, 1955. 96 pp. Price, $.50.

This Public Health Monograph consists, for the most part, of a very detailed consolidation of the data from six illness surveys conducted in the United States between the years 1928 and 1943, with most of the data collected during the 1920's and 1930's. There are a large number of graphs and some twenty tables, including annual age specific case rates for more than one hundred diagnostic categories. Of particular interest is the translation of the incidence of illness in terms of the total number of days of disability and of hospitalization per unit of population.

Much of the data in the early part of the monograph deal with experience relating to the bacterial illnesses at a time when the antibiotics were not fully utilized. It is therefore likely that some of the data (for example, the total days of disability caused by pneumonia) would be much different today.

Of great value is the material in the latter part of the monograph, which is based not only on these early surveys but also on much more recent data. This material makes startlingly clear the enormous change in medical and hospital care which has occurred in our country since 1935. For example, in 1935, 39 per cent of all live births occurred in the hospital; in 1950, 88 per cent. In 1935, there were 56 admissions to hospitals per 1,000 persons, while in 1950 the figure was 110 (both figures exclusive of admissions to federal hospitals and covering conditions other than mental illness or tuberculosis).

This kind of data and the trends they indicate are very clearly and effectively presented in this monograph. For those who are concerned with the planning of personnel and facilities designed to meet the health needs of the community, this monograph represents a very useful summarization of sickness experience.

MARTIN CHERKASKY

Manual for Sewage Plant Operators—Clayton H. Billings, Editor (2nd ed.). Austin, Tex.: Texas Water and Sewage Works Association, 1955. 511 pp. $5.50 for members of the TWSWA; $6.50 for others; from Mrs. Earl H. Goodwin, Assistant Secretary Treasurer, 2202 Indian Trail, Austin.

A revision of the first edition published in 1947 (see A.J.P.H., p. 1485, 1947), this volume is presented as a companion volume to the "Manual for Water Works Operators" (see A.J.P.H., p. 1014, 1951) for the guidance of water and sewage treatment plant operators. Although several chapters give some attention to theory, the principal effort is to discuss practical problems in a way to aid the operator. Where any difference would arise, as in financing sewerage systems, state laws and standards, and stream pollution, the peculiarities of conditions in Texas are given special attention. Twenty-seven chapters and five appendixes discuss the operator's interests from financing to certification of operators. The new chapter on oxidation ponds should be particularly interesting because of the extensive Texas experience reflected in it. Ten chapters of the original volume have been exten-

sively rewritten and the one on sand filtration has been omitted.

This volume, like its counterpart for water operators, is dedicated to Victor M. Ehlers as "Texas' internationally famous pioneer sanitary engineer."

FRANCIS B. ELDER

Housing the Aging—Edited by Wilma Donahue. Ann Arbor, Mich.: University of Michigan Press, 1954. 280 pp. Price, $3.75.

This is the published report of the University of Michigan Fifth Annual Conference on Aging, held at Ann Arbor in July, 1952. The conference was planned on the basis that the job of housing for old people cannot be done by any single group but will require the best talents of many. Statisticians, psychologists, sociologists, housing and community planners, builders, architects, physicians, hospital administrators, public housing officials, representatives of real estate and insurance businesses and of government social security programs discussed how older people live and how they wish to live; how to provide housing for well older people and for those requiring sheltered care and medical supervision; how to finance housing for the aging; and how to get community action. An interesting web results from this weaving of theoretical warp with practical woof, using such diverse threads as a profile of the aging individual by a gerontologist of the Harvard Medical School and some down-to-earth remarks on mortgage financing by the executive vice-president of the United States Savings and Loan League in Chicago.

Inevitably, as in all books or conferences on the subject, more questions are posed than are answered. However, if there was any conclusion reached in common it was that the situation is not as dark as sometimes pictured. Neither provision of housing for the aging nor hospitalization for the long-term patient is "a new venture of the twentieth century" and, despite difficulties, significant progress has been made in the last ten years. Underlying problems have been clarified, and there has been real gain in providing sheltered care and medical supervision. Although facilities are not available in adequate amount, "as the results of caring well for old people, now sensed by only a few, become known to more we can confidently expect that the needs will be met." And there is continuing progress in providing better working and living conditions in urban centers. This means progress in providing decent housing for able-bodied older people, since "it is essential to approach the problem on a broad basis if we are concerned with housing standards for all our older people; providing housing for a major segment of older persons can only be achieved as basic progress is made in providing decent housing for the nation as a whole."

All in all, the book should fulfill the hope of its editor that it may serve as a timely source of communication between the researchers, the planners and builders, and the older people themselves.

ELEANOR WATKINS

Canadian Cancer Conference (Vol. 1)—Edited by R. W. Begg. New York: Academic Press (125 East 23rd St.), 1955. 443 pp. Price, $8.80.

This volume represents a collection of 33 scientific papers prepared by 40 contributors from Canada, Denmark, and the United States, read at the First Canadian Cancer Research Conference at Honey Harbour, Ontario, June 16–19, 1954. The material is well arranged and indexed; there are a total of 1,050 technical references given by the contributors; 77 tables, 61 figures and 15 pages of photomicrographs accompany the text.

There is a brief history of the National Cancer Institute of Canada in the fore-

word and a discussion of the preselection of the subject matter for the conference in the preface to the text. The papers are arranged under the chapter headings of: Experimental Tumors; Tumor-Host Relations; Informal Discussion on Cancer of the Lung; Enzymes; Ionizing Radiations.

This volume does not attempt to cover in any complete way the recent developments in cancer research, nor does it give a detailed review of the subject; instead, experimental tumors are discussed and their induction and transplantation are considered; the effects of tumor growth on the host are brought under the scrutiny of specialists who attempt to unravel and interpret the metabolic processes and interrelationships. Fifty pages of discussion and references are devoted to the subject of environmental cancer and are from the pen of W. C. Hueper; the material covered will sound familiar to those who have heard him, or read his articles.

This is a worthwhile report of an interesting conference which students and researchers in fields of growth and metabolism will find stimulating.

LEONID S. SNEGIREFF

Evaluation in Mental Health—Public Health Service Publication No. 413 Washington, D. C.: Supt. of Documents, Gov. Ptg. Office, 1955. 292 pp. Price, $2.00.

This review of the problem of evaluating mental health activities is timely, ably prepared and useful to all who are concerned about appraisal of health services. It is a report of a Subcommittee of the Community Services Committee of the National Advisory Mental Health Council.

The volume consists of a 60-page discussion, an annotated bibliography of 431 articles dealing directly with evaluation, an additional 553 which are more general and are catalogued as a supplementry reference list, and an author index. The material is excellently organized. The outline is a contribution in itself.

The volume deals with the assessment of accomplishment primarily. It presents an opportunity for a study of the literature in the belief that investigators might thereby proceed differently with their own projects and that the results might have tighter research design and that greater knowledge concerning evaluation might be evolved.

This is a perceptive study and report. The writing of the first section, particularly the portion on theoretical considerations, is considerably above the usual report style. It is provocative and practical. The first sixty pages present a review which no serious student of mental health or health administration should miss, either for his knowledge or pleasure. ROSCOE P. KANDLE

Expanding Horizons in Medical Social Work—By Dora Goldstine. Chicago, Ill.: University of Chicago Press, 1955. 274 pp. Price, $5.00.

This book is a companion piece to an earlier collection of articles edited by Dora Goldstine, "Readings in the Theory and Practice of Medical Social Work." In the former volume, Miss Goldstine concentrated upon collecting from various periodicals articles discussing basic practice in medical social work. This book is a collection of articles which represents expanding services in medical social practice essential in the carrying out of its purposes.

The subjects covered are: (1) the administration of medical social work in various medical and health agencies, (2) participation in community organization and planning, (3) professional education, and (4) research. The author hoped that the collection would not only serve current interest and usefulness, but would also provoke interest

in further study where the articles "exemplify developments whose significance for future practice is yet to be assessed."

This thought occurs to the reader throughout. For instance, in the section concerned with the participation of medical social workers in education of professional persons other than social workers, Harriett Bartlett and Dr. William W. Beckman in their article "Teaching of Social and Environmental Factors in Medicine: Some Unsolved Problems," point up some problems from their own experience, many of which are presently under consideration in many medical schools.

This collection is an important reference work which can serve to review not only what has been examined, but also should provide an impetus for needed study for the future. ROSE S. SEGAL

The Human Machine—By Charles W. Shilling. Annapolis, Md.: U. S. Naval Institute Publication, 1955. 292 pp. Price, $5.00.

Since LaMettire wrote his "L'homme Machine" (1750), nearly every generation has seen a similar book come out. This book makes one feel the ocean breezes going through its pages. Originally written for students at the Naval Academy, it can expect to have many other readers of college age, as its very readable, informal style—the "I-You" approach—has great appeal.

It is divided into three sections, the first one dealing with structure and operation of the human machine. The author has avoided the pitfalls, expressing the hope that a companion study "to interpret the complex patterns of human behavior in the military environment" might be forthcoming. Here and there the didactic approach, via engineering terms, leads to underplaying the role of biochemical and hormonal relationships of the human organism.

The parallelism between man and machine is excellently handled in such chapters as Underwater Activity, Aviation Medicine, and especially Twentieth Century Warfare—atomic, biological and chemical. Flow-chart-type illustrations and comphrensive tables add materially to this worth-while publication.

This is a new approach in textbooks and serves its intended purpose well—"to meet the needs of all non-medical men." A basic understanding of man's physical being is essential to the process of self-assessment and personal adjustment in relation to the demands of military life. BRUNO GEBHARD

Sexual Hygiene and Pathology. A Manual for the Physician—By John F. Oliven. Philadelphia, Pa.: Lippincott (East Washington Square), 1955. 481 pp. Price, $10.00.

This volume by a psychiatrist is intended for physicians and is presented throughout at a professional level.

The volume is organized in four parts: Sexuality in Childhood; Sexuality in the Second Decade; Sexuality of the Normal Adult, and Sexual Pathology. The viewpoint is broad and it is not limited to that of psychiatry. It aims to provide a physician with the facts which can be obtained directly only through close observation of a lifetime. An excellent balance between fact and theory is maintained. The subject is exhaustively treated. The chapter on homosexuality, for example, represents an excellent resumé of the literature and will be helpful to public health workers faced with handling problems of this kind.

The book is unique in its scope and contents. It is highly recommended.

REGINALD M. ATWATER

Books Received

Listing in this column acknowledges the receipt of books and our appreciation to the senders. Space and the interests of readers will permit review of some, but not all, of the books listed.

ADVANCES IN EXPERIMENTAL CARIES RESEARCH. Reidar F. Sognnaes, editor. Washington, D. C.: American Association for the Advancement of Science, 1955. 246 pp. Price, $6.75 and $5.75 to AAAS Members.

ANTIMETABOLITES AND CANCER. Edited by Cornelius P. Rhoads. Washington, D. C.: American Association for the Advancement of Science, 1955. 312 pp. Price, $5.75 and $5.00 to AAAS Members.

BRITAIN. AN OFFICIAL HANDBOOK (1955 edition). New York: British Information Services, 1955. 438 pp. Price, $1.80.

CHEMICAL ABSTRACTS. SUBJECT INDEX (A-M) VOL. 48 DECEMBER 25, 1954. Easton, Pa.: American Chemical Society, 1955.

CHEMOTHERAPY OF MALARIA. G. Covell, G. R. Coatney, et al. WHO Monograph Series No. 27. New York: Columbia University Press, 1955. 121 pp. Price, $3.25.

COUNSELING IN MEDICAL GENETICS. Sheldon C. Reed. Philadelphia, Pa.: Saunders, 1955. 268 pp. Price, $4.00.

EARNING OPPORTUNITIES FOR OLDER WORKERS. Wilma Donahue, Editor. Ann Arbor, Mich.: University of Michigan Press, 1955. 277 pp. Price, $4.50.

EDUCATION FOR THE PROFESSIONS. Organized and edited by Lloyd E. Blauch for U. S. Department of Health, Education, and Welfare. Washington, D. C.: Gov. Ptg. Office, 1955. 317 pp. Price, $1.75 paper, $2.75 buckram.

GOVERNMENT EXPENDITURES AND RELATED DATA ON HEALTH AND SOCIAL WELFARE 1947 TO 1953. Social Security Series, Memorandum No. 14 (2nd ed.). Ottawa, Canada: Research Division, Department of National Health and Welfare, 1955. 84 pp.

HANDBOOK OF HOSPITAL PSYCHIATRY, A. Louis Linn. New York: International Universities Press, 1955. 560 pp. Price, $10.00.

IDENTIFICATION OF ENTEROBACTERACEAE. P. R. Edwards and W. H. Ewing. Minneapolis, Minn.: Burgess Publishing, 1955. 179 pp. Price, $4.00.

INDUSTRY AND TROPICAL HEALTH II. PROCEEDINGS OF THE SECOND CONFERENCE INDUSTRIAL COUNCIL FOR TROPICAL HEALTH. Sponsored by the Harvard School of Public Health, April 20–22, 1954 in New York and Boston. Boston, Mass.: Harvard School of Public Health, 1955. 266 pp.

INTRODUCTION TO DEMOGRAPHY. Mortimer Spiegelman. Chicago, Ill.: Society of Actuaries, 1955. 309 pp. Price, $6.00.

MACMILLAN MEDICAL CYCLOPEDIA. William A. R. Thomson. New York: Macmillan, 1955. 1013 pp. Price, $6.95.

JOSIAH MACY, JR. FOUNDATION, THE. 1930–1955. New York: Josiah Macy, Jr. Foundation, 1955. 174 pp.

MAP—WORLD DISTRIBUTION OF SPIROCHETAL DISEASES. 2. RELAPSING FEVERS LOUSE-BORNE AND TICK-BORNE. New York: American Geographical Society, 1955. $1.25 folded, $1.50 flat.

MICROBIOLOGY. AN INTRODUCTION. Ernest A. Gray. New York: Philosophical Library, 1955. 175 pp. Price, $3.75.

PREVENTION OF DISEASE IN EVERYDAY PRACTICE, THE. Isadore Givner and Maurice Bruger. St. Louis, Mo.: Mosby, 1955. 964 pp. Price, $20.00.

PREVENTION OF OCCUPATIONAL SKIN DISEASES. Louis Schwartz. New York: Association of American Soap & Glycerine Producers, Inc. Prices quoted on request. 42 pp.

PRINCIPLES OF INDUSTRIAL WASTE TREATMENT. C. Fred Gurnham. New York: Wiley, 1955. 399 pp. Price, $9.50.

SEX IN CHRISTIANITY AND PSYCHOANALYSIS. William Graham Cole. New York: Oxford University Press, 1955. 329 pp. Price, $4.00.

STORY OF MEDICINE, THE. Arthur L. Murphy. New York: Bouregy and Curl, 1955. Price, $3.00.

IT'S TIME YOU KNEW. Gladys Denny Shultz. Philadelphia, Pa.: Lippincott, 1955. 221 pp. Price, $2.95.

VITAMINS IN NUTRITION AND HEALTH. Audrey Z. Baker. New York: John de Graff, 1955. 147 pp. Price, $2.75.

ZOONOSES IN THEIR RELATION TO RURAL HEALTH, THE. Karl F. Meyer. Berkeley, Calif.: University of California Press, 1955. 50 pp. Price, $1.00.

A Selected Public Health Bibliography with Annotations

Last Year 20,000 Died—The proportions of cancers of the various organs that kill people (during the first half of life) change from age period to age period and are found in differing ratios in the sexes. Though there are signs of small improvement in the various mortality pictures throughout most of the age periods in both sexes, the death rate for cancer of the breast increased during the last decade.

ANON. Cancer in Adults Before Midlife. Statist. Bull. Metrop. Life Insur. Co. 36, 6:1 (June), 1955.

Still They Go West—"During the past 15 years the West has had a marked influx of population from other sections of the country, principally the south midwest." The statistics will interest you as will the discussion of their significance.

ANON. Population Still Moving Westward. Statist. Bull. Metrop. Life Insur. Co. 36, 6:6 (June), 1955.

For Program Planners—Just as a reminder that the incidence and general destructiveness of the communicable diseases are not things of the past, 10 of the 40 viral diseases and seven of the more numerous bacterial diseases are briefly but strikingly commented upon. The conquest of the communicable diseases remains one of the compelling problems of our times, the author rightfully concludes.

BAUER, T. J. The Communicable Disease Problem in the United States. J.A.M.A. 158, 16:1407 (Aug. 20), 1955.

Appetite Un-jaders—This will introduce to you the "Six Food Exchange Lists." Their purpose is to allow the diabetic to choose foods that may make life more bearable, thereby increasing the chances that he will adhere to his diet. The lists should prove a blessing to fat people, too.

CASO, E. K., and YOULAND, D. M. An Apple for an Orange. Am. J. Nursing 55, 6:942 (Aug.), 1955.

Medical vs. Social Advance—"Thus it may be that in the future the ethic of clinical medicine and of preventive medicine, respectively, may come to differ, to make even greater the divergence between these two main branches of medicine that has already developed." This forecast, which seems to run quite contrary to the philosophy commonly expressed on this side of the water, is quoted chiefly to call your attention again to this important periodical which is not just a trade journal for health educators but is instead something that all might read with profit.

CREW, F. A. E. The Changing Philosphy of Health. Health Ed. J. 13, 2:115 (May), 1955.

No Cause for Complacency—Even after a half-century of investigations, the problem of silicosis is still far from being settled. Several obstacles remain to be hurdled, primarily in the resolution of technical questions—so concludes this review of dust studies made by the Public Health Service.

DOYLE, H. N., et al. Accomplishments in the Epidemiologic Study of Silicosis in the United States. Arch. Indust. Health. 12, 1:48 (July), 1955.

Safe Water—Here three questions are looked into—can enteric viruses be detected in water, does their nonsurvival under various treatment procedures parallel that of the coliform

bacteria, and does the absence of coliforms indicate the biologic quality of the water? Some nice laboratory investigations were set up to search for answers to these questions, and though the answers are not final they are, at least, reassuring.

GILCREAS, F. W., and KELLY, S. M. Relation of Coliform-Organism Tests to Enteric-Virus Pollution. J. Am. Water Works A. 47, 7:683 (July), 1955.

"Eating for Two"—Nutritional supplements given to pregnant women did not produce bigger or better babies. If that bald statement doesn't induce you to hunt out this first of a series of studies what would?

KASIUS, R. V., et al. Maternal and Newborn Nutrition Studies at Philadelphia Lying-In Hospital. Milbank Mem. Fund Quart. 33, 3:230 (July), 1955.

Salk Vaccine—A Resume—Out of the welter of writings on Salk vaccine and the practical problems in 1955 comes this revealing study from the angle of the businessman, putting at the center the financial risks involved and the profits anticipated. Here are fresh angles worth anyone's time.

KLAW, SPENCER. Salk Vaccine: The Business Gamble. Fortune Magazine (Sept.), 1955.

More Mind and Body—In so far as mental hygiene becomes identified with public health—and vice versa—by so much should we heighten our understanding of, and interest in, the import of this series of excellent papers. Only the first can be mentioned here, but almost the entire series seem to be pointed directly to the public health worker reader.

LEMKAU, P. V. Why Are We Interested in Mental Health? Ment. Hyg. 39, 3:353 (July), 1955.

Gadgets for Living—Having been recently taken into the administrative family of public health, rehabilitation becomes another area about which well grounded workers will want to have at least a nodding acquaintance. With illuminating detail this paper tells a lot about what is being done to rehabilitate the chronic arthritic patient.

LOWMAN, E. W., et al. Total Rehabilitation of the Rheumatoid Arthritic Cripple. J.A.M.A. 158, 15:1335 (Aug. 13), 1955.

Who Does What?—Discussing the diagnosis, treatment, and prevention of community ills, the author offers this prophesy: "The next fifty years holds the promise for the great development of the art and science of community health as a distinctive profession. It will include all those professional backgrounds which must be associated in a team of democratic equals for the scientific diagnosis and treatment of the community."

MCGAVRAN, E. G. A Concept of Health Essential to Cost Analysis. M. Social Work 4, 3:91 (July), 1955.

From Wide-Open Spaces—A survey of rural children in a Minnesota county revealed many reactors to histoplasmin (an over-all prevalence of 7.8 per cent) with high rates in certain households. Parallel tests with tuberculin uncovered only 1.1 per cent of reactors. Epidemiologic implications of the latter low incidence are profitably discussed.

SACHS, D., et al. The Prevalence of Positive Reactions to Tuberculin and Histoplasmin in a Rural Minnesota County. Am. J. Hyg. 62, 1:43 (July), 1955.

Required Reading—No part of this symposium can safely be passed over by the public health worker who wants to keep up with the poliomyelitis prophylaxis parade. In the series of

papers, Salk reviews recent findings in the preparation and use of vaccines and explores possibilities of future changes. Scheele and Shannon tell about early difficulties in testing and outline current licensing standards. Dublin gives some new details of the 1954 field trials and Francis reports on further studies of the effectiveness of the vaccine in warding off paralytic poliomyelitis. Scheele closes the formal part of the presentation with the conclusion that "the vaccine is, at present, our most useful weapon in the prevention of paralytic poliomyelitis." Revealing questions and answers follow.

SALK, J. E. Considerations in the Preparation and Use of Poliomyelitis Virus Vaccine (and five related papers). J.A.M.A. 158, 14:1239 (Aug. 6), 1955.

The Sick Get Sicker—Subscribers to a medical care plan who were treated for illness in January were checked again in April and then compared with a control group who had no treatment during the first month. Those who were sick in January had more new (and unrelated) illnesses in April than did the controls. Likely meanings of this phenomenon are explored.

SMILEY, J. R., et al. A Short-Term Longitudinal Morbidity Investigation. Milbank Mem. Fund Quart. 33, 3:213 (July), 1955.

If additional information is desired regarding the articles listed in this Bibliography, please communicate directly with the publication in which they appeared; the addresses are furnished for your convenience.

Am. J. Hyg. (American Journal of Hygiene), 615 N. Wolfe St., Baltimore 5, Md.
Am. J. Nursing (American Journal of Nursing), 2 Park Ave., New York 16, N. Y.
Arch. Indust. Health (Archives of Industrial Health), American Medical Association, 535 N. Dearborn St., Chicago, Ill.
Health Ed. J. (Health Education Journal), Tavistock House, Tavistock Sq., London, W.C. 1, England.
Fortune Magazine, 9 Rockefeller Plaza, New York 20, N. Y.
J.A.M.A. (Journal of the American Medical Association), 535 N. Dearborn St., Chicago, Ill.
J. Am. Water Works A. (Journal of the American Water Works Association), 521 Fifth Ave., New York 17, N. Y.
M. Social Work (American Association of Social Workers), 1700 Eye St., N.W., Washington 6, D. C.
Ment. Hyg. (Mental Hygiene), National Association for Mental Health, 372–374 Broadway, Albany, N. Y.
Milbank Mem. Fund Quart. (The Milbank Memorial Fund Quarterly), 40 Wall St., New York, N. Y.
Statist. Bull. Metrop. Life Insur. Co. (Statistical Bulletin Metropolitan Life Insurance Company), One Madison Ave., New York 10, N. Y.

Association News

EIGHTY-THIRD ANNUAL MEETING
AMERICAN PUBLIC HEALTH ASSOCIATION
KANSAS CITY, MO., NOVEMBER 14–18, 1955

APPLICANTS FOR FELLOWSHIP

In accordance with the By-laws of the Association, the names of applicants for Fellowship are officially published herewith. They have requested affiliation with the Sections indicated. Official action by the various Section Councils, the Executive Board (acting on unaffiliated applications), the Committee on Eligibility, and the Governing Council will take place during the Annual Meeting in Kansas City, Mo., November 14–18, 1955.

Health Officers Section

John H. Ackerman, M.D., M.P.H., Director, Venereal Disease Control Div., State Board of Health, Jacksonville, Fla.

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APHA membership application blank on page XXIX

Notice of Errors in the 10th Edition of Standard Methods for the Examination of Water, Sewage, and Industrial Wastes

Attention is called to the following errors that appeared in the initial printing of the 10th Edition of Standard Methods for the Examination of Water, Sewage, and Industrial Wastes and that have been corrected in the second printing:

p. 136, par. 3.3, 2nd line—change to read "0.31g $Al_2(SO_4)_3 \cdot 18H_2O$. . . ."

p. 252, right column—the last factor of the right side of the equation should be "12 I_2"

p. 253, par. 2.7, 2nd line—change to read "1.0*N*: Dissolve 248.2g. . . ."

p. 255, left column—in each equation, left side, numerator, place the values "P — u" in parentheses so that it appears "(P — u)x"

p. 264, par. 3.6—last word should be "unreliable."

p. 308, right column—the present par. 3.10 *Ferrous sulfate* should be deleted and subsequent paragraphs renumbered to 3.10, 3.11 and 3.12.

p. 378, right column, next to last line in the next to last par. preceding section D—change the line to read "broth to a plate, thence to lactose." . . .

Subsequent to closing the forms for the second printing, the following additional errors were noted. These will be included in the next printing.

p. 17, right-hand column, first full paragraph —change to read "As a general rule, results shall be expressed in terms of the substance actually determined. Exceptions to this, such as reporting boron as the element, B, rather than as borate, will be noted in the sections dealing with specific determinations."

p. 47, par. 2.3.1a—change the second line to read "and scale type sensitive to 0.25 micro-"

p. 126, par. 3.4—add a new sentence "Store in a cool, dark place."

p. 135, right-hand column—the chemical symbol in the numerator of the right side of the equation should be $Mg_2P_2O_7$.

p. 153, par. 1.1—change to read "The color system obeys Beer's law up to 0.18 mg/l as nitrogen, or 0.6 mg/l nitrite, with a 1 cm light path at 520 mμ."

p. 170, right column, 3rd line—change to read "After 10 min, but before 15 min, using the same specific interval for all determinations, measure the color. . . ."

p. 197, top of right column—change last factor of numerator of fraction to read 411.5

p. 399, par. 2.1—change third line to read: "tilled water and dilute to 100 ml. This"

Isolation Means Impoverishment

"The most casual acquaintance with our own history, or with the history of science and scholarship, makes it clear that intellectual and scientific isolation means intellecual and scientific impoverishment"—Dean Rusk, president, Rockefeller Foundation, New York City, at National Conference on Exchange of Persons, February 23–25, 1955.

83rd ANNUAL MEETING

HOW TO MAKE HOTEL RESERVATIONS FOR THE KANSAS CITY ANNUAL MEETING

A HOUSING BUREAU will be operated by the Kansas City Convention Bureau for the 83rd Annual Meeting of the APHA in Kansas City, Mo., November 14–18. Since all requests for rooms will be handled in chronological order, you are urged to send in your reservation as quickly as possible on the form below.

Hotel	Hotel and Rates Single	Double	Twin
Hotels immediately adjacent to Auditorium:			
Aladdin	$4.00– 7.00	$6.00–10.00	$ 8.00–10.00
Continental	5.00– 7.00	7.00– 9.00	8.00–12.00
Dixon	4.00– 5.00	6.00– 7.00	8.00– 9.00
Kansas Citian	3.50– 6.00	5.50– 8.50	6.00– 8.00
Muehlebach	6.50–13.00	8.00–13.00	10.00–15.00
New Yorker	5.00–10.00	7.00–12.00	9.00–12.00
Phillips	6.00– 7.50	8.00– 9.50	9.00–11.00
President	5.00– 9.00	8.00–11.00	10.00–13.00
Senator	3.00– 6.00	3.50–10.00	8.00–15.00
State	4.00– 6.00	6.25– 8.25	7.50– 9.00
Hotels within three or four blocks of Auditorium:			
Pickwick	4.50– 7.50	6.00– 9.00	6.50– 9.50
Plaza	2.00– 3.50	2.50– 5.00	
Hotels within short taxi ride from Auditorium (approximately 45¢):			
Alcazar	2.50– 3.50	3.00– 5.00	
Ambassador	4.00– 6.00	5.50– 7.50	5.50– 7.50
Bellerive	5.00– 8.00	7.50–10.50	9.00–10.50
Town House (65¢ cab fare from Auditorium)	5.00– 9.00	7.50–10.00	8.50–14.00

Rates for suites available on request.

HOTEL RESERVATION FORM

MAIL TO: Miss Mary Nugent
Housing, Convention and Visitors Bureau
1030 Baltimore, Kansas City 6, Mo.

PLEASE MAKE RESERVATIONS NOTED BELOW: (Please Print or Type.)

First Choice ..... Hotel Arrival: ....., at ..... a.m. ..... p.m.

Second Choice ..... Hotel Departure ....., at ..... a.m. ..... p.m.

Third Choice ..... Hotel

..... Single room @ $..... ..... Twin Bedroom @ $.....

..... Double Bedroom @ $.....

NAMES OF ALL OCCUPANTS: ADDRESSES:

....

....

....

MAIL CONFIRMATION TO: Signed: .....

Address .....

..... City Zone State

Confirmation will be mailed within 30 days of receipt of this form by the Division of Housing, Convention Bureau, Kansas City, Mo.

KANSAS CITY TOURIST COURTS, TRAILER CAMPS, AND MOTELS

Good motel rooms are available at prices ranging from $4.00–$7.00 per day for two, $12.00 for four, within easy distance of Kansas City. You will be assigned to good, convenient motel rooms if you will indicate below your interest in such. Motel reservations will be made by the Housing Bureau and confirmed by the motel.

All the following are members of the Kansas City Motel Association:

Ace of the Hi-Way Court	8216–71 Highway
Annette Modern Cabins	81 and 61 Highway
Arrow Court	Highway 24 and 71 Cutoff
B-B Lodge	Highway 40 and Blue Ridge Cutoff
Capital Service Station and Cabins	116 and 71 Highway
Clay Motel	4018 N. Oak
Collins Court	9501 E. New 40 Highway
Crown Motor Court	4340 State-Kansas City, Kans.*
Davidson Courts	115 and 71 Highway
El Cabanas	½ Mile East of City Limits on No. 50
Flicklin Tourist Court	3647 State-Kansas City, Kans.*
Four-Acre Motel	8220 So. 71 Highway
Hi-Way Motel	71 Highway and Bannister
Gables Motel	6831 State-Kansas City, Kans.*
Holiday Inn Hotel	US 40 and 71 By Pass (5 miles East of Kansas City, Mo., and 3 miles South of Independence, Mo.)
Johnson Motel Tourist Courts	107 St. and 71 Highway
Kozy Kourt	36 Terrace and New 40 Highway
Leeds Motel Courts	3707 Raytown Road
Putthoff's Modern Cottages	40 Highway and Blue Ridge
Rainbow Auto Court	5912 E. 50 Highway
Royal Auto Court	7831–69 Highway
Skyline Court	3531 N. Oak, N. Kansas City
Sky-Vu Motel	New 40 Highway and Marsh, N. Kansas City
U. Smile Station No. 1	Old 40 Highway and Raytown Road
U. Smile Motel	50 Highway at 58th Street
U. Smile Court	40 Highway and Skiles
Waight's Tourist Camp	79 and 50 Highway
West Haven Motor Court	5250 State-Kansas City, Kans.*
Wornall Motel Tourist Court	8215 Wornall
Young's Motel	5024 Merriam Drive, Kansas City, Kans.*

* Kansas City, Kans., is one mile from Kansas City, Mo.

MOTEL RESERVATION FORM

MAIL TO: Miss Mary Nugent
Housing, Convention and Visitors Bureau
1030 Baltimore, Kansas City 6, Mo.

Please assign Motel accommodations for ..... persons arriving on November ..... and leaving on November .....

NAMES OF ALL OCCUPANTS: ADDRESSES:

....

....

....

....

MAIL CONFIRMATION TO: Signed: .....

Address .....

..... City Zone State

Employment Service

The following pages present information for those seeking public health personnel and for those seeking positions in public health. Other information concerning vacancies and personnel available is on file in the Association Office. Anyone wishing to have the benefit of this additional information can obtain it by writing to the Vocational Counseling and Placement Service of the Association.

Advertising space in these pages is available at special rates for the use of employers or individuals. The charges are $5 for the first 50 words or fraction thereof and $1 for each additional 10 words or fraction thereof. There is no charge to members or Fellows of the Association who desire to utilize the **Positions Wanted** portion of these pages.

POSITIONS AVAILABLE

Public Health Physician—Chief, Division of Chronic Diseases. Responsible position involving the development and direction of a chronic diseases control program. Experience in public health required. Experience in chronic diseases control program desirable. Eligible for Ohio license. Write Director, Ohio Dept. of Health, Columbus 15, Ohio.

Physician—for health department tuberculosis diagnostic chest clinic. Experience in tuberculosis and interpretation of chest roentgenograms desirable. Salary range: $7,913–$9,142. Civil service appointment, sick leave, pension system, and vacation benefits. Apply to: E. R. Krumbiegel, M.D., Commissioner of Health, 200 E. Wells St., Milwaukee, Wis.

Director—Division of Tuberculosis Control—Applicant must have postgraduate training in clinical tuberculosis or public health, four years' practice of medicine two of which were in clinical tuberculosis or administrative public health. Salary $15,000.

Chief—Section of Maternal and Child Health and Crippled Children's Services. Applicant must have postgraduate training in pediatrics, obstetrics or public health, and three years' administrative experience in public health. Limited substitutions permitted. Salary open. Write Alaska Department of Health, Alaska Office Bldg., Juneau, Alaska.

The City of Cedar Rapids is accepting applications for the position of **Public Health Engineer.** Age 25–50. Qualifications: degree from accredited school of engineering, either civil or sanitary. Two years' experience in public health work, municipal, state, or federal. Salary $5,200. Applications may be obtained by writing the Civil Service Commission, City Hall, Cedar Rapids, Iowa. Applications must be returned by October 15, 1955.

Public Health Engineer or Administrator—Excellent opportunity in middle-sized city for a recent graduate. Organization of a strong municipal health department in process. Salary range from $5,352 to $6,504 per year. Apply City Manager, Ottumwa, Iowa.

Assistant Director—Health Education—Wisconsin Anti-Tuberculosis Association, 1700 West Wells St., Milwaukee. Graduate of accredited school of public health, additional experience preferred. Responsibilities entail generalized health education consultation to 63 affiliates. Field work half-time. Automobile necessary. Salary range $4,100–$5,600, depending on qualifications. Additional employee benefits.

Chief Health Educator and Health Educator—Civil service examination will be held soon to fill vacancy in California city health department. Present salaries: chief health educator, $450–$563 per month; health educator, $360–$450. Liberal retirement, auto allowance, sick leave, and vacation privileges. M.P.H. degree in health education required. Secure application forms from D. M. Bissell, M.D., Health Officer, 285 S. E. Market St., San Jose, Calif.

Sanitarian—for Peoria City Health Department. Assistant to the director of Division of Sanitation. Should have M.P.H. degree and experience. $4,800, plus good retirement benefits, starting salary. Dr. Fred Long, City Hall, Peoria, Illinois.

Sanitarians—for general sanitation work in Anchorage, Fairbanks, Juneau, Bethel, and Kotzebue, Alaska areas. Choice of work in Eskimo or white areas. Benefits include Alaska Merit System, Territorial Blue Cross Plan, Social Security, and Credit Union. Provision for regular salary advancement and cost of living allowance at some stations. Starting salary ranges from $430 to $485 per month. Supervisory positions require minimum of eight years' education and experience and staff positions a six-year minimum. Transportation paid for employee from Seattle to Alaska duty station and 500 pounds personal effects transported. Write: Chief, Section of Sanitation and Engineering, Alaska Department of Health, Juneau, Alaska.

Sanitarian—for a full-time local health department serving a metropolitan community of 50,000. Interesting work. Merit system appointment, sick leave, and six weeks' annual leave. Hunting and fishing. Salary $430–$505, plus $60 cost of living allowance. Write to: Richard C. Murphy, M.D., M.P.H., District Health Officer, Greater Anchorage Health District, P. O. Box 968, Anchorage, Alaska.

Public Health Staff Nurses—for generalized public health nursing program in Monterey County Health Department, Salinas, Calif. Two positions on the Monterey Peninsula. Salary range $3,900–$4,812; five-day, 40-hour work week. Employee must own car, nine cents per mile. California certificate in public health nursing required. Myron W. Husband, M.D., Director of Public Health, 154 West Alisal St., Salinas, Calif.

Medical Social Caseworker—Graduate degree and minimum of two years' experience, for expanding social service department in a large teaching tuberculosis hospital. Excellent personnel policies and opportunity for advancement. Beginning salary $4,800. Tuberculosis and Health Society, 153 E. Elizabeth, Detroit 1, Mich.

Public Health Supervisors—Educational Assistant and General Field Supervisor for combination agency. Professional staff 42, including tuberculosis consultant, VD clinic supervisor, physical therapist, four general supervisors, and two assistant supervisors. Program covers generalized field nursing; child health conferences; venereal disease, tuberculosis, food handlers, and immunization clinics; mothers' clubs; and parochial school nursing. Student nursing program with Ohio State University. Salary open depending on qualifications. **Staff Nursing Positions** are also available. Write Executive Director, The Visiting Nurses Association (City of Dayton Bureau of Nursing), 401 Municipal Building, Dayton 2, Ohio.

Bacteriologist—New York State county laboratory. Modern well equipped and staffed laboratory. Master's degree or bachelor's degree with equivalent experience. Civil service, but temporary appointment can be arranged. Salary $4,200 going to $4,700 by five annual $100 increments. Joseph Lebowich, M.D., Director, Saratoga County Laboratory, 215 Church St., Saratoga Springs, N. Y.

Psychiatric Social Worker (one)—Dade County Child Guidance Clinic, 275 N. W. 2nd St., Miami, Fla. Stephen C. Wright, M.D., director. Jeannette B. Schwartz, chief social worker; affiliated with the University of Miami. Social work student training program pending with the Florida State University Graduate School of Social Work. Challenging opportunity in a newly developing child guidance clinic to work with the team approach. Must be a graduate of an approved school of social work with a P.S.W. major and preferably some experience in a child guidance clinic. Salary range: $4,080–$5,280; to be adjusted on the basis of qualifications, training, and experience. Excellent personnel practices. Position now available.

Public Health Nursing Positions—Available in Health Department with the City of Flint a rapidly growing city of 180,000 population. Beginning, intermediate, and administrative positions are available. Five-day, 40-hour week with liberal retirement, vacation, and sick leave policies. Beginning salary rates, depending on experience and qualifications, $3,498–$3,783–$4,147 with automatic increases. Apply Flint Civil Service Commission, City Hall, Flint, Mich.

Qualified Public Health Nurses—for generalized program in county-city health department in Pacific Northwest. Salary $315–$380. Forty-hour week, liberal vacation, and sick leave allowance; inservice training; graduate student affiliation; retirement plan; and travel allowance for use of own car. Write Division of Public Health Nursing, Tacoma-Pierce County Health Dept., 2324 Pacific Ave., Tacoma 2, Wash.

Public Health Nurse Supervisor—for generalized program in county-city health department in Pacific Northwest. Salary $345–$440. Forty-hour week; liberal vacation and sick leave allowance; inservice training; graduate student affiliation; retirement plan; and travel allowance for use of own car. Bachelor's degree and experience in both rural and visiting nursing service required. Work involves supervision of 10 qualified public health nurses. Write Division of Public Health Nursing, Tacoma-Pierce County Health Dept., 2324 Pacific Ave., Tacoma 2, Wash.

Qualified Public Health Nurses—Must be eligible for California certificate. Salary $341–$376. Travel allowance for use of private car. Write to San Benito County Health Dept., Health Center Bldg., Hollister, Calif.

Two **Public Health Nurses** needed—Generalized with school program. Upper Sacramento Valley in foothills of Sierra Mountains. Liberal personnel policies; 37½ hour week; no uniforms; optional county car or eight cents a mile. Salary $315–$391. Write G. L. Faber, M.D., M.P.H., Director, Butte County Health Dept., P. O. Box 1100, Chico, Calif.

Veterinarian—Must be graduate of AVMA accredited school and possess Michigan license. Salary $5,446. Director, Kalamazoo City-County Health Department, City Hall, Kalamazoo, Mich.

Director, Maternal and Child Health Bureau—Pennsylvania Health Department. Nation-wide open competitive merit system positions, $10,260–$12,108. Directs state-wide program, maternal-child health.

Director, Public Health Nursing Bureau—Pennsylvania Health Department. Nation-wide open competitive merit system position, $6,990–$8,352. Directs state-wide public health nursing program.

Director, Division of Alcoholic Studies and Rehabilitation—Pennsylvania Health Department. Nation-wide open competitive merit system position, $8,352–$10,260. Directs state-wide program, alcoholism research, treatment, and rehabilitation.

Chief, Venereal Diseases Division—Pennsylvania Health Department. Nation-wide open competitive merit system position, $8,352–$10,260. Directs state-wide VD control program.

Chief, Cancer Control Division—Pennsylvania Health Department. Nation-wide open competitive merit system position, $8,352–$10,260. Directs state-wide program of cancer control. For information and applications, write to State Civil Service Commission, Box 569, Harrisburg before final filing date of November 25, 1955.

Sanitary Engineers and Sanitary Chemist—to work on state public health program. Previous Ohio residence not required. **Sanitary Engineer III**—primarily for public water supply development and water treatment. Supervision of design and operation. Graduation from accredited engineering college, five years' experience, professional engineer registration from Ohio or reciprocal state required. Salary range $500–$600. **Sanitary Engineer II**—primarily for river basin water pollution studies involving collection, interpretation and assembly of report data. May lead to additional phases of public health engineering. Graduation from accredited engineering college, four years' experience, ability to qualify for registration. Salary range $440–$525. **Engineer-In-Training**—to assist in river basin water pollution studies. Graduation from accredited engineering college, including having certificate of professional engineer-in-training. Salary range $360–$440, $400–$480, $440–$525 based on experience. **Sanitary Chemist**—responsible for analytical work of mobile laboratory assigned to river basin water pollution studies. Graduate in chemistry. One year's experience in sanitary chemistry. Salary range $360–$440. Write to: Personnel Office, Ohio Dept. of Health, Columbus 15, Ohio.

Washington State—Attractive positions are available for public health nurses in well established full-time local health departments in Washington State. Salary range $301, $314, $328, $343, and $358 per month. Appointments may be made above the beginning rate for experienced nurses. Five-day week plus vacation, sick leave, and mileage allowance. Persons interested should write at their earliest convenience to: Robert G. Beaumier, State Dept. of Health, 1412 Smith Tower, Seattle.

Public Health Engineer or Administrator—Excellent opportunity in middle-sized city for a recent graduate. Organization of a strong municipal health department in process. Salary range from $5,352 to $6,504 per year. Apply City Manager, Ottumwa, Iowa.

Health Educator—for long established well organized health department. Master's degree from approved school of public health, with specialization in health education required. Salary $4,200–$4,800. Good personnel policies. Agency car provided. Cattaraugus County Dept. of Health, P.O. Box 573, Olean, N. Y.

Public Health Nurse 9—Graduation from a recognized school of nursing plus completion of NLN program of public health nursing consisting of nine months' academic and three months' field work. License to practice in the state of Texas. One year of experience in public health nursing. C. Wedgeworth, Civil Service Board, Dallas, Tex.

Public Health Staff Nurse—Generalized program including school nursing; 22 staff nurses; supervision, continuous staff education, opportunity for student advisor experience; must be eligible for P.H.N. and R.N. certification in California. Salary range: $341–$426 a month; 11 paid holidays; 10 working days vacation; sick leave; pension; car furnished. Write: San Jose City Health Dept., San Jose, Calif.

Public Health Nurse Supervisor—Generalized nursing program, including school nursing, training center for P.H. personnel, well organized health department. Must be eligible for P.H.N. and R.N. certificate. Salary range $360–$450 a month; 11 paid holidays; 10 working days vacation; sick leave; and pension. Write: San Jose City Health Dept., San Jose, Calif.

POSITIONS WANTED

Report and Program Writer—interpretation of bacteriological and physical laboratory data, statistical analysis of variance and preparation of final reports. Bacteriologist (M. S.). Three years of intensive experience in virus, virus pilot plant, and pathogenic experimentation. Security cleared and immunized for pathogens. Immediately available due to contract termination. **Box L-47,** Employment Service, APHA.

Commercial Advertisements

All communications on the following commercial advertisements should be sent to Burneice Larson, Medical Bureau, Palmolive Building, Chicago 11, Ill.

OPPORTUNITIES AVAILABLE

(a) Public health physician; direct district, 100,000; $12,000, expenses. (b) School physician; school population 21,000; 12 nurses; East. (c) Directors, maternal, child and crippled children's services; outside the United States. (d) Public health physician to serve as assistant director, one of leading insurance companies. (e) Public health physician, direct university student health department; West. (f) Public health nursing faculty member; state college; South; $5,000–$6,200. (g) Public health nursing administrator; qualified direct bedside care program and coordinate work of private agency; large city, educational center, Midwest. (h) Public health nursing supervisors; $5,000–$6,000; outside the United States. (i) Head department, 350-bed hospital affiliated 26-man clinic; duties: coordinating work with community, teaching, East. (j) Public health nurses, sanitary engineers and health educators; foreign assignments. (k) Statistician to serve as assistant or associate professor, university school of medicine. (l) Health inspector; knowledge of meat and dairy product inspection required; foreign assignment; two-year contract; renewable; $8,400. (m) Sanitarian; two-county health department; resort area, Michigan. (n) Public health bacteriologist; one of larger cities, Alaska; $430–$565, dependent qualifications.

OPPORTUNITIES WANTED

(a) Public health nursing administrator; MPH; five years, consultant, state health department, four years, health coordinator, liberal arts college. (b) Public health physician; MPH Johns Hopkins; five years, director, city health department; three years, professor, preventive medicine. (c) Health educator; MPH; nine years, director, health education, metropolitan health department. (d) Sanitarian; BS; year's graduate training. Environmental Sanitation; eight years, state health department.

" . . . A prescription for health.

. . . A community consciousness of current health problems and a will to tolerate them no longer.

. . . The very best and most current information that medical science can offer as to the best means available to attack each of the community health problems which plague us.

. . . A corps of trained and experienced public health professional and technical people representing the many disciplines required to staff a modern department of health.

. . . A tradition of reward for service within that professional and technical staff."

(From an address given by Governor George M. Leader of Pennsylvania, August 18, 1955, at the Fourth Annual Health Conference, State College, Pa.

News from the Field

WHO News

Mental Health Legislation

The problem of what mental health legislation is and should be is the subject of the fourth report of the WHO Expert Committee on Mental Health. "The true functions of legislation affecting the mentally ill and mentally subnormal" says the report, "are to enable treatment and care to be given and at the same time to protect the patient and society. . . . Good mental health legislation should be a help rather than an obstacle to psychiatric care."

The report reviews present legislation, deals with the essential requirements of legislation affecting psychiatric treatment, emphasizing a positive approach by which provision is made for treatment facilities, the training and recruitment of specialized staff, and the establishment of a community psychiatric service. Considerable space is devoted to the problem of the unwilling patient.

Also published by WHO is a survey of existing legislation on the hospitalization of mental patients. The material included was gathered from questionnaires answered by more than 40 governments, from some 40 books and articles, and from material published in the International Digest of Health Legislation.

These two documents in effect portray what is mental health legislation and what should be, in the light of current psychiatric knowledge.

Legislation Affecting Psychiatric Treatment: fourth Report of the WHO Expert Committee on Mental Health. Technical Report Series, 1955, No. 98; 25 pp., 30 cents. Hospitalization of Mental Patients: A Survey of Existing Legislation, 100 pp., $1.25. Columbia University Press, 2960 Broadway, New York 27, N. Y.

Eastern Mediterranean Consultants

The Eastern Mediterranean Office of WHO in Alexandria has taken on four specialists to assist in expanding maternal and child health and health laboratory services and in preventing sleeping sickness.

Dr. E. W. Poulton, senior pediatric registrar at Whipps Cross Hospital, London, is advising health authorities of the region on developing services for mothers and children and training the necessary specialized personnel. Catherine J. F. M. Oomen of the Netherlands is midwifery tutor at the Maternal and Child Health Center in Teheran. Dr. Edward Haddad, on leave from the Medical Services, Belgian Congo government, is adviser for a demonstration campaign for the prevention of sleeping sickness in the Sudan. The fourth consultant, Dr. Roland Milville Dowdeswell, coming from the American University of Beirut where he has been visiting professor of bacteriology, is laboratory director of the Qalyub Demonstration Area in Egypt.

UNICEF'S Milk Conservation Program

UNICEF has assisted in establishing in India a cooperative plant to produce buffalo milk in powdered form. The plant began operation in October, 1955. Buffalo milk, which accounts for more than half of all milk in the country, has a butter fat content of from 6 to 7 per cent as compared with 3 to 5 per cent for cow's milk.

Another new example of UNICEF assistance to increase milk supply is found in Indonesia where plans are be-

ing made to produce milk from soy beans and peanuts. In Baghdad, Iraq, and in Yugoslavia, UNICEF has recently helped to set up units for sterilizing milk in hot bottles, enabling it to be kept without refrigeration for two or three days. In Baghdad, also, UNICEF is equipping a modern dairy.

Altogether in various parts of the world UNICEF has voted aid for 172 milk conservation plants, about one-fourth of which remain to be completed.

World Social Welfare Bibliography

The United Nations has published a "Bibliography of Publications of the United Nations and Specialized Agencies in the Social Welfare Field" covering the years 1946–1952. Included are 704 publications of 14 specialized agencies and of the UN itself. Prepared by the Bureau of Social Affairs from which it is available without charge. Department of Economic and Social Affairs, United Nations, N. Y.

Ages of Presidents of Professional Organizations

Harvey C. Lehman, professor of psychology, Ohio University, recently published in The Scientific Monthly (Vol. 80, No. 5, May, 1955) a study entitled "Ages at Time of First Election of Presidents of Professional Organizations," which has interest for the membership of the American Public Health Association.

The study presents a record of ages of the presidents of 66 national learned, scientific, and technical societies listed from the oldest to the youngest, according to the mean age of the presidents. In this series of 66, the American Public Health Association ranks as No. 25 from the top, the oldest mean age being at the top of the list.

The average age of 72 presidents of the American Public Health Association at time of election has been 55.37 years. Societies with higher figures include the American Bar Association, 64; American Society of Civil Engineers, 63; American College of Surgeons, 62; American Medical Association, 60; American College of Physicians, 58; American Association for the Advancement of Science, 58; National Association of Manufacturers, 57.

The societies with younger mean ages include American Chemical Society, 55; American Society of Mechanical Engineers, 54; American Bankers Association, 54; American Association of School Administrators, 53; American Dental Association, 53; National Education Association, 53; American Statistical Association, 53; Society of American Bacteriologists, 50, and American Psychological Association, 46. Corresponding age of presidents of the United States is 55.9.

1955 Pennsylvania Health Conference

The Fourth Annual Health Conference at State College, Pa., was held August 15–18 under the auspices of the State Department of Health, the State Medical Society, the Pennsylvania Public Health Association, and the State Health Council. More than 1,000 persons were in attendance.

In addition to the staff meetings arranged by the state health authorities, there were extensive programs in civil defense, public health education, in methods of achieving and maintaining accuracy in laboratories, in water supply and sewerage, in public health dentistry and veterinary public health, and special sessions on chronic diseases and child health together with a Golden Anniversary Commemoration of 50 years of public heatlh in Pennsylvania.

The Annual Meeting of the Pennsylvania Public Health Association was addressed by Herman E. Hilleboe, M.D.,

commissioner of health, New York State Department of Health and president of the American Public Health Association. Honorary membership certificates were awarded to Alice M. O'Halloran and I. Hope Alexander, M.D.

Officers for the coming year include R. Winfield Smith, president, and Robert H. Carr, secretary-treasurer.

California Studies Chronic Disease

The California State Department of Health has recently announced the completion of the field phase of what is said to be the first state-wide health survey in the United States. Provisional data show that each day during the period May, 1954–January, 1955, on the average, 65 of every 1,000 Californians were disabled by illness or injury, of whom three-fourths were disabled by chronic conditions. Acute upper respiratory and gastrointestinal illnesses accounted for the disability of the remainder.

This study, supported by a grant from the National Institutes of Health and the cooperative efforts of major agencies in the health, education, and employment fields, involved the regular collection of data from a sample consisting of 12,000 households or 35,000 persons throughout the state. The methods were pretested in a pilot project in San Jose in 1952. Information was obtained on type of illness or injury, age, sex, marital status, occupation, urban or rural residence, type of health insurance coverage, smoking habits, use of medical care services, and other pertinent factors. The California department has stated that the project staff will undertake an intensive analysis of the survey and publication of the results during the present fiscal year. Basic general morbidity information and indexes of the health status of various population groups within the state will then be available.

The study has been carried on by the Bureau of Chronic Diseases, whose chief is Lester Breslow, M.D.

Rehabilitation of Mental Patients

The Veterans Administration reports that long-term mental patients are being discharged as productive citizens through a program of hospital job experience for pay. Although instituted less than a year ago, the Member-Employee Program, as the project is officially known, has already resulted in the successful discharge of 111 chronic patients. Under the plan long-term patients ready to leave the hospital become salaried employees, live in employee quarters, come and go freely as other employees do, and fill regular civil service positions. They are thus conditioned for the normal work and social experiences they will meet in outside employment.

The program was developed and tested by Peter A. Peffer, M.D., formerly manager of the VA hospital at Perry Point, Md., now of the one at Brockton, Mass. With the success of the test all VA neuropsychiatric hospitals having living quarters for employees have been authorized to institute the program; 19 have done so. A total of 345 patients have been placed in hospital jobs ranging from dental technician to messenger. In addition to the 111 successful outside placements already mentioned, 90 have been readmitted to the hospitals for further treatment, and 144 are still working as member-employees.

Idaho Rheumatic Fever Program

The Idaho Department of Health and the Idaho Heart Association are sharing equally in a $100,000 free penicillin program to curb rheumatic fever in the state. Penicillin is being provided physicians for use in treating the medically indigent.

Health Aspects of Pest Control

"Health Aspects of Pest Control: Industry and Official Agency Relations" is made up of the papers given at the inservice course for pest control operators in December, 1954, at the University of Michigan. The training course was sponsored jointly by the School of Public Health and the Wolverine Pest Control Association. Papers presented at the proceedings present the viewpoints of commercial pest control operators, as well as public health officials with regard to health aspects involved in pest control. Considered was not only pest control as a means for prevention of certain diseases but also hazards to health that may be introduced by the use of certain pest control chemicals. University of Michigan, School of Public Health, Ann Arbor, Mich., $2.

Industrial Health Fellowship

A fellowship in industrial hygiene leading to the degree of master of public health (industrial health) is offered by the James S. Kemper Foundation. It covers tuition and academic fees at the University of Michigan School of Public Health and a reasonable living allowance during residence at the university. Application should be made directly to the Dean, School of Public Health, University of Michigan, Ann Arbor.

The James S. Kemper Foundation was established in 1942 by an insurance company group managed by James S. Kemper of Chicago. One of its purposes is to aid qualified persons to take advantage of educational opportunities particularly helpful to an insurance career.

Sanitation in Places of Employment

"American Standard Minimum Requirements for Sanitation in Places of Employment" discusses sanitation for industrial establishments. This report is a revision of the American Standard Safety Code for Industrial Sanitation in Manufacturing Establishments adopted in 1935. Its purpose is "to describe minimum sanitary requirements for the protection of the health of employees" in all permanent places of employment except where domestic, mining, or agriculture work only is performed. It does not go into a discussion of the control of toxic materials but confines itself to such topics as general housekeeping, light and ventilation, water supply, toilet facilities, and lunchrooms. American Standards Association, 70 E. 45 St., New York 17; 50 cents.

Study Recreation for Handicapped

The Welfare and Health Council of New York City has undertaken a three-year study to explore the possibilities and demonstrate ways in which group work, camping, and recreation services can be extended to orthopedically handicapped children. It is hoped to develop healthy community attitudes toward the handicapped and to develop opportunities for the handicapped and nonhandicapped to live and play together.

The project is being supported by the Association for the Aid of Crippled Children on a matching basis.

Avoiding Salk Vaccine Black Market

The Food and Drug Administration has hired 48 temporary investigators on special assignment to enforce the federal prescription drug law against possible "black market" distribution of the Salk poliomyelitis vaccine. The investigators will check on the distribution of the vaccine in order to account for all of the vaccine made or shipped. An appropriation of $300,000 was made by

the 84th Congress to cover the expenses of this special program.

FDA activities will be carried out in connection with the voluntary plan of the Department of Health, Education, and Welfare for allocation of the vaccine under which the states will have responsibility for its intrastate distribution both through commercial and public agency channels.

Chicago to Fluoridate Water

Fluoridation of Chicago's water supply was recently ordered by Mayor Richard J. Daley following Governor William G. Stratton's veto of a bill that would have authorized a referendum on the health measure. In his message vetoing the bill which had the support of antifluoridation forces, the governor pointed out that "a referendum cannot establish or destroy a scientific fact." Although the city council had authorized the measure more than a year ago, protests from a small "citizen's group" had successfully blocked the proposal until the mayor stepped in. It will take from six to eight months to complete actual fluoridation of the city's billion-gallon-a-day water supply. The Chicago water system serves 3,600,000 persons in the city and some 500,000 others in 51 suburbs. It is said to pump more water daily than any other system in the world.

County Health Department Campaign

In August petitions were presented to the county commissioners of Erie County, Pa., requesting them to put on the ballot at the November election the question of establishing a county health department. The petitions contained more than three times the number of signatures required by law.

The Erie County Health Council is leading the campaign which has been approved by the county medical society, tuberculosis association, welfare council, county long-range planning committee, and the Junior Chamber of Commerce. Television and radio programs began late in July. Liaison persons from both the Democratic and Republican parties have been appointed looking forward to the adoption of the county health department in the platforms of both parties.

Royal Society for Health

The Royal Sanitary Institute, founded in 1876, "for the purpose of promoting the health of the people" has changed its name to the Royal Society for the Promotion of Health. An announcement indicating the change of name says, "The title of the Institute is today descriptive of only a fraction of the above activities. The Council have, therefore, given long and careful consideration to the title and have concluded that it would be desirable if the original meaning of 'sanitary' were restored by translating it into 'health,' a term which already appears in the armorial bearings as salus generis humani. . . . The Council have every confidence that this important measure will meet modern circumstances, give added prestige to membership and maintain the Institute in the forefront of successful endeavour."

Immunization Booklet Supplement

A supplement to the booklet, "Immunization Information for International Travel," carrying changes made in immunization requirements from June, 1954, to June, 1955, has just been released by the Public Health Service. Persons having a 1954 edition of the booklet may obtain copies of the supplement, free of charge, from the Division of Foreign Quarantine of the Service, Washington 25, D. C.

The booklet itself, including the sup-

plement, may be purchased from the Government Printing Office, Washington 25, D. C.; 20 cents; a 25 per cent discount on orders of 100 or more copies.

Red Cross Medical Advisory Group

The American Red Cross has created a medical advisory committee to serve as consultants in Red Cross activities having medical aspects, such as first aid, disaster relief, and nursing program. (The blood program has its own group of consultants.) The group is made up of nine physicians, among them William D. Stovall, director, Wisconsin State Laboratory of Hygiene, Service Memorial Institute, Madison, and George M. Wheatley, 3rd vice-president, Health and Welfare, Metropolitan Life Insurance Company, New York City.

Army Employs at Top Grade

The U. S. Army has received authority from the Civil Service Commission to employ civilian physicians at dispensaries, infirmaries, outpatient clinics and laboratories at the top step of each respective grade. The new authority allows the Army to employ civilian physicians at beginning annual salaries from $7,465 to $11,395.

Although increasing numbers of civilian doctors are being employed in Army medical installations, openings exist in practically every locality. Physicians having a license to practice medicine in any of the states or the District of Columbia are eligible for Army employment. Applications should be made to the nearest Army installation or Army medical facility of one's choice.

Travel of Ground Pollution

One of the currently studied methods of disposing liquid discharges from sewage disposal plants is recharging of the soil at various levels with the liquids. An immediate problem in connection with this method is that of polluting ground water. "Report on the Investigation of Travel of Pollution" reports the results of extensive studies conducted at the University of California for the California State Water Pollution Control Board. Among the many characteristics of the sewage flow observed was the fact that bacteria travel rapidly at the start of recharging, but in the investigations reported the maximum distance of travel was found to be about 100 feet. Satisfactory rates of recharge, method of recharge well construction and operation, and precautions to be observed are also presented. These studies were part of the Water Pollution Board's program for the replenishment of ground water and protection of these water supplies from pollution. State Water Pollution Control Board, Sacramento, Calif., Publication No. 11.

Outdoor Swimming Pools

The National Recreation Association has published a 20-page pamphlet "Outdoor Swimming Pools" covering planning, design, and construction of swimming pools, as well as the factors to be considered in determining community needs for a swimming pool. The general recommendations with regard to construction and operation in so far as they parallel the APHA report "Recommended Practice for Design, Equipment and Operation of Swimming Pools and Other Public Bathing Places" agree with that report. The National Recreation Association, 8 West 8th Street, New York 11, N. Y.; 75 cents.

National Academy of Sciences

At its 92nd annual meeting in Washington in April, the National Academy

of Sciences elected 30 new members, among them seven from health disciplines. They are:

Gilbert Dalldorf, M.D., director, Laboratories and Research, New York State Department of Health

Ralph Waldo Gerard, M.D., Neuropsychiatric Institute, University of Illinois

Colin M. MacLeod, M.D., professor of microbiology, New York University College of Medicine

Horace Winchell Magoun, professor of anatomy, University of California Medical Center

Robley Cook Williams, biophysicist, Virus Laboratory, University of California

David Wright Wilson, professor of physiological chemistry, University of Pennsylvania School of Medicine

Perry William Wilson, professor of bacteriology, University of Wisconsin.

An Alcoholism Foundation

The Alcoholism and Addictive Diseases Foundation has been created with the following reported aims:

1. To conduct research into the problems related to addictions
2. To work with established treatment and rehabilitation centers and establish new ones as needed
3. To assist teaching institutions in training professional, technical, and other personnel in the care and rehabilitation of alcoholics and drug addicts
4. To develop programs of information and education for the general public.

Included in the announcement of the foundation's formation is the statement that "unearned wealth is perhaps the chief cause of alcoholism."

The Board of Trustees is made up of 16 men drawn chiefly from officers of business corporations, with a sprinkling of former college presidents. The chairman of the board is General Donald Armstrong, president of the National Academy of Economics and Political Sciences and former president of the U. S. Pipe and Foundry Company. Chairman of the organizing committee was Spencer Miller, Jr., former U. S. Assistant Secretary of Labor. Frederic R. Briggs, is acting president. There is no medical representation on the board. Headquarters are at 135 East 44th St., New York City.

New Officers for ASTM

The following took office in the American Society for Testing Materials at the close of the 58th annual meeting held June 26-July 1 in Atlantic City:

President—Claire H. Fellows, The Detroit Edison Company, Detroit, Mich.

Vice-President—R. T. Kropf, Belding Heminway Co., New York, N. Y.

PERSONALS

GERONIMO H. ALVAREZ, M.D., M.P.H.,† is now general director of coordination, Ministry of Public Health, Republic of Argentina, Buenos Aires.

CAPTAIN R. W. BARIONE, MC, USN,* has become executive secretary of the Armed Forces Epidemiological Board, Washington, D. C.

LENORE BAJDA, M.D.,† director, Lowndes County (Miss.) Health Department, has resigned to become assistant health officer and director of clinical services, Montgomery County Health Department, Rockville, Md.

LIEUTENANT COLONEL PHILIP R. BECKJORD (MC), USA, M.P.H.,* has completed a two-year tour as chief, Department of Health Practices, Army Medical Service Graduate School in Washington, D. C., and has begun studies leading to the degree of doctor of public health at the Johns Hopkins University School of Hygiene and Public Health, Baltimore, Md.

BERNARD BUCOVE, M.D.,† chief, Division of Local Health Services, Washington State Department of Health, has been appointed acting state director of health, succeeding J. A. Kahl, M.D.,* resigned to become director of the Group Health Co-operative of Puget Sound, Seattle.

LEGRAND B. BYINGTON, M.D.,* medical director, Public Health Service, retired, who has been health officer of Kansas City-Wyandotte County during the absence of H. Wallace Lane, M.D.,† on military leave,

* Fellow.
† Member.

has been appointed director of disease control, Denver City-County Department of Health and Hospitals, Colo.

COLONEL ROBERT L. CALLISON (MC), USA, M.P.H.,† former chief, Environmental Control and Sanitation Branch, has been appointed chief, Preventive Medicine Division, Office of the Surgeon General of the Army, Washington, D. C.

KENNETH W. CHAPMAN, M.D., a Public Health Service medical officer and specialist in narcotic addiction programs, has been assigned to the Community Services Branch, National Institute of Mental Health, Bethesda, Md., to assist states and communities in developing programs of prevention, control, and treatment of drug addiction.

GERALD R. CLARK, M.D., M.P.H.,* director, New Mexico Department of Public Health, Santa Fe, has resigned to enter the field of mental health on the staff of the Norristown State Hospital, Pa.

L. M. CLARKSON * has been promoted from instructor to assistant professor of preventive medicine and public health, Vanderbilt University School of Medicine, Nashville, Tenn.

FRED DE ARMOND,† former director, Health Education Section, Santa Clara County (Calif.) Health Department, has been appointed head of the Health Education Section, Washington State Department of Health, Seattle.

JOHN H. DINGLE, M.D.,* professor of preventive medicine, Western Reserve University, School of Medicine, Cleveland, Ohio, has been elected president, Armed Forces Epidemiological Board, Washington, D. C.

HORACE DELIEN, M.D.,* medical director, Public Health Service, and currently chief, Health and Sanitation Division, International Cooperation Administration, Philippines, has been awarded a fellowship by the Philippine Public Health Association for his achievements in the field of public health.

JAMES F. DOWNEY, just returned from two and one-half years in the U. S. Army, is now in the Bureau of Health Education, Missouri Division of Health, Jefferson City.

IRA L. ERNST, former administrator, Monmouth Memorial Hospital, Long Branch, N. J., has resigned to join the consulting staff of ANTHONY J. J. ROURKE, M.D.,* of New Rochelle, N. Y.

HARRY A. FABER,† former managing editor of Water and Sewage Works, is now sanitary engineering research grants officer, Public Health Service, Washington, D. C.

LEO FOX,† associate sanitary biologist, Division of Sanitary Engineering, Massachusetts Department of Public Health, is on a three-month leave of absence with the Army Quartermaster Research and Development Command in Natick.

S. ELEANORE GILL,† formerly at the University of Pittsburgh, has been appointed resident lecturer in public health nursing, University of Michigan School of Public Health, Ann Arbor.

EDWARD S. GODFREY, M.D.,* retired health Commissioner of New York State, received the Hermann Biggs Award of New York State Public Health Association at its June meeting in Lake Placid.

RUTH E. GROUT, Ph.D.,* has been promoted to professor of public health and education, School of Public Health, University of Minnesota, Minneapolis.

FRANCIS A. HOCHSTEIN, Ph.D., has been named research associate in chemical research and development, Chas. Pfizer and Co., whose staff he first joined in 1949.

CARL C. JANOWSKY, M.D.,† former health officer, Burke County, N. C., is director, District 6, Philadelphia (Pa.) Department of Public Health.

HENRY W. KASSEL, M.D.,* former chief of medical programs, Public Health Service, has been named medical officer in charge of the Indian Health Area Office in Albuquerque, N. M., covering four states.

EDWARD KUPKA, M.D., chief, Bureau of Tuberculosis Control, California State Department of Public Health, Berkeley, has returned from his assignment as public health officer, Foreign Operations Administration in Vietnam, Cambodia, and Laos.

GEORGE J. KUPCHIK,† former director of environmental sanitation, Yonkers Department of Health, has been appointed senior civil engineer, Bureau of Sanitary Engineering, New York City Department of Health.

CHAUNCEY D. LEAKE, Ph.D., executive director, University of Texas Medical Branch, Galveston, has been appointed assistant dean, college of medicine and professor of pharmacology, Ohio State University, Columbus.

STANLEY J. LELAND, M.D., M.P.H.,† former director, Preventive Medical Services, Idaho State Department of Health, has resigned to become director, New Mexico State Department of Health, Santa Fe, succeeding GERALD R. CLARK, M.D., M.P.H.,* resigned.

JAMES LIEBERMAN, D.V.M., M.P.H.,* veterinary training consultant, Training Branch

* Fellow.
† Member.

of the Public Health Service's Communicable Disease Center in Atlanta, Ga., has recently returned from a two and one-half month assignment as veterinary public health consultant to the European Regional Office of WHO in Geneva, Switzerland.

ESMOND R. LONG, M.D.,* has retired as director of the Henry Phipps Institute, University of Pennsylvania, Philadelphia, and has severed his connections with the Research Division of the National Tuberculosis Association. He served at Phipps Institute for 23 years and among many responsibilities was formerly president of the National Tuberculosis Association.

IAN DOUGLAS MCLAREN, M.D.,† formerly in charge of public health in Korea and Japan, who has completed nine months of training with the State Health Department, is now health commissioner, Cattaraugus County, N. Y.

JOHN H. MURDOCH, former assistant executive director, United Cerebral Palsy of Pennsylvania, has joined the public relations staff, Bureau of Public Health Education, Pennsylvania State Health Department, Harrisburg.

JAMES F. MORGAN, former head chemical hygienist, Industrial Hygiene Foundation of America, Mellon Institute, Pittsburgh, is head of the newly established Section of Industrial Hygiene in the Medical Department, Pennsylvania Railroad.

KAARLO W. NASI,* sanitary engineer director, Public Health Service, formerly assigned to the Foreign Operations Administration as chief, Far East Branch, Public Health Division, is now assistant Chief, Water Supply and Water Pollution Control Program of the Service, Washington, D. C.

JOSEPH G. NORBY, member and past-president of the American Hospital Association, and presently a hospital consultant and executive secretary, Milwaukee County United Hospitals Fund, received the 1955 Award of Merit of the American Hospital Association at the banquet of the association's 57th annual convention in Atlantic City in September.

ALICE M. O'HALLORAN, R.N., director, bureau of Public Health Nursing, Pennsylvania State Department of Health, Harrisburg, for the past 50 years, retired from active service on May 31. She joined the Health Department in November 1905, a few months after it was established.

EINAR A. OLSEN, director of health education, Essex County (Mass.) Health Association, has resigned to become associate professor of health and physical education, Texas Western College, El Paso.

CYNTHIA ANN PALMER has been appointed health educator, Norfolk County (Mass.) Tuberculosis and Health Association.

KATHRYN A. ROBESON,† former resident lecturer in public health nursing, is now associate professor of public health nursing, University of Michigan School of Public Health, Ann Arbor.

HAROLD ROMER,† former assistant director Bureau of Sanitary Engineering, New York City Department of Health, has been named director, succeeding ALBERT N. AERYNS,† retired.

ELIZABETH M. RUNKLE, former staff nurse, Cleveland's University Hospitals, has been appointed instructor in surgical nursing, Frances Payne Bolton School of Nursing, Western Reserve University, Cleveland, Ohio.

JAMES A. SHANNON, M.D.,† who has been associate director, National Institutes of Health, Public Health Service, Bethesda, Md., has been appointed director of the National Institutes of Health.

WILLIAM H. SEBRELL, JR., M.D.,* Assistant Surgeon General, Public Health Service, and director, National Institutes of Health, Bethesda, Md., has retired after 30 years' service to become research consultant to the American Cancer Society, New York City.

LEONARD H. SCHUYLER, M.D., former research fellow in medicine, Vascular Research Laboratory, New York Hospital-Cornell University Medical School, has been appointed an assistant medical director, American Heart Association.

HARVEY L. SHAPIRO, M.P.H.,† former regional administrative methods consultant, Children's Bureau in New York, has been appointed an assistant director, Beth Israel Hospital, Boston, Mass.

ELWOOD A. SHARP, D.Sc., director of clinical investigation, Parke, Davis and Company, has been promoted to medical assistant to the firm's president.

HARRY SHUBIN, M.D.,† chief visiting physician, Rush Hospital, and chairman, Department of Pulmonary Diseases at Philadelphia (Pa.) General Hospital, has been elected president of the American Academy of Tuberculosis Physicians.

GEORGE W. STILES, M.D.,* former director, Laboratory Section, Colorado State Department of Health, Denver, was recently honored by the Denver Medical Society in recognition of 50 years of medical practice.

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* Fellow.
† Member.

LYON P. STREAN, D.D.S.,* head of dental research, Merck and Co., Rahway, N. J., has been transferred to chief of dental medicine, Sharp and Dohme Division of Merck and Co., West Point, Pa.

HARVEY WILKE,† associate professor of sanitary engineering, Purdue University, is on a year's leave as visiting professor, University of Alexandria, Egypt, on a WHO assignment.

GEORGE R. WILLIAMS,† consultant in field service, Pennsylvania Tuberculosis and Health Society, has resigned to join the staff of the National Tuberculosis Association, New York City.

ALICE H. WIGHTMAN, former supervisor, Visiting Nurse Service of New York City, is now assistant professor of nursing, Frances Payne Bolton School of Nursing, Western Reserve University, Cleveland, Ohio.

DEATH

ELIM YI-LIN MEI, M.D., Dr.P.H.,† tuberculosis control officer, Health Branch, Navajo Agency, USPHS, Window Rock, Ariz., in an automobile accident on July 29 (Health Officers Section).

CONFERENCES AND DATES

American Public Health Association, 83rd Annual Meeting, Kansas City, Mo., November 14–18.

State and Regional Public Health Meetings:

Florida Public Health Association. Daytona Plaza Hotel, Daytona Beach, Fla. October 20–22.

Michigan Public Health Association. Pantland Hotel, Grand Rapids, Mich. October 6–8.

New Mexico Public Health Association. Santa Fe, N. M. October 12–14.

Oklahoma Public Health Association. Student Union—A & M College. Stillwater, Okla. November 7–9.

Tennessee Public Health Association. Maxwell House Hotel, Nashville, Tenn. November 30–December 2.

Meetings of Other Organizations Coming in October, November, and December:

American Academy of Pediatrics. Palmer House, Chicago, Ill. October 3–6.

American Association of Medical Record Librarians. La Salle Hotel, Chicago, Ill. October 3–7.

American Dental Association. San Francisco, Calif. October 17–20.

American Dietetic Association. St. Louis, Mo. October 18–21.

American Heart Association. New Orleans, La. October 22–26.

American Occupational Therapy Association. San Francisco, Calif. October 22–28.

American Public Welfare Association. Hotel Statler, Washington, D. C. November 30–December 3.

American Society of Civil Engineers. New York, N. Y. October 24–28.

Association of American Medical Colleges. New Ocean House, Swampscott, Mass. October 24–26.

Association of State and Territorial Health Officers. Washington, D. C. November 6–12.

Council of National Organizations of the Adult Education Association of the U.S.A. Atlantic City, N. J. December 12–13.

Federation of Sewage and Industrial Wastes Associations. Atlantic City, N. J. October 10–13.

International Association of Milk and Food Sanitarians, Inc. Augusta, Ga. October 4–6.

National Association for Mental Health. Indianapolis, Ind. November 4–6.

National Committee on Homemaker Service. Hotel Windemere, Chicago, Ill. October 20–21.

National Conference on Physicians and Schools. Hotel Morraine, Highland Park, Ill. October 12–14.

National Nurse Week. October 9–15.

National Safety Council. Conrad Hilton Hotel, Chicago, Ill. October 17–21.

National Social Welfare Assembly. New York, N. Y. December 8–9.

National Society for Crippled Children and Adults. Palmer House, Chicago, Ill. November 28–30.

United Cerebral Palsy. Washington, D. C. November 19–21.

White House Conference on Education. Washington, D. C. November 28–December 1.

* Fellow.
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Educational and Experience Qualifications of Public Health Laboratory Workers
Educational Qualifications of Executives of Voluntary Health Associations
Educational Qualifications of Community Health Educators
Educational Qualifications of Directors of Public Health Departments (Proposed)
Educational Qualifications of Medical Administrators of Specialized Health Activities
Educational Qualifications of Medical Social Workers in Public Health Programs
Educational Qualifications of Nutritionists in Health Agencies
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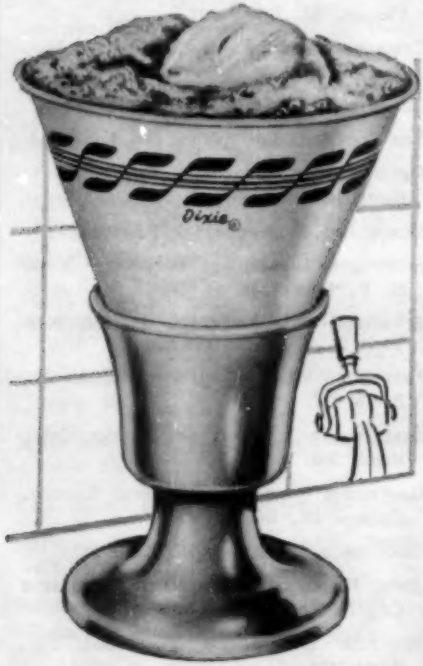

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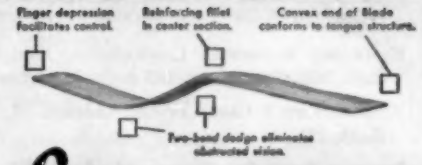
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1. Gyorgy, P.: On Some Aspects of Protein Nutrition, Am. J. Clin. Nutrition 2:231 (July-Aug.) 1954.
2. Davies, J.N.P.: Kwashiorkor, Trans. Ninth Conf. on Liver Injury, Josiah Macy, Jr. Foundation, 1950, p. 109.
3. The National Food Situation, Washington, D. C., Agricultural Marketing Service, United States Department of Agriculture, Oct. 29, 1954, p. 4.

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